CITY MANAGER'S OFFICE
CITY OF NEWARK

220 South Main Street · Newark, Delaware 19711
302.366.7000 · Fax 302.366.7035 · www.newarkde.gov

_____
Bid Security

_____
Vendor

CITY OF NEWARK

Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

Notice
Do not disassemble. Return intact with
properly completed forms or bid may be rejected.

CITY OF NEWARK

Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

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CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

NOTICE OF LETTING

Sealed bids for Contract No. 21-01 NORTHWEST BOOSTER STATION GENERATOR will be received in the City of Newark Purchasing Office (220 South Main Street; Newark, Delaware 19711) until 2:00 p.m., prevailing time, on Tuesday, February 16, 2021 and will be publicly opened and recorded in the Council Chamber shortly thereafter.

Alternatively, bids may also be emailed in PDF form to the City Purchasing Division at purchasing@newark.de.us by the deadline noted above and will be opened immediately after the closing date and time and will be publicly recorded in the Council Chamber shortly thereafter.

The NORTHWEST BOOSTER STATION GENERATOR project includes, but is not limited to, the completion of nine (9) sanitary sewer point repairs as shown on the contract drawings.

A non-mandatory pre-bid meeting will be held at the Northwest Booster Station located at 109 Delrem Drive, Newark DE 19711 on January 26, 2021 at 10:00 a.m. Perspective bidders are encouraged but not required to visit the site before submitting a bid. Failure to visit the site and observe existing conditions will in no way alleviate the Contractor from information that could be obtained from visiting the site. A bid bond equal to not less than 10% of the bid price must accompany the bid. To visit the project site please contact Tim Filasky at tfilasky@newarkde.us.

All questions/requests for information regarding this contract (bid process, drawings and technical specifications, etc.) must be submitted via email to purchasing@newark.de.us by 5:00 p.m. on Friday, January 29, 2021 to allow staff sufficient time to develop answers to questions deemed appropriate. Please submit all questions/requests for information in bulk (e.g., in a Word document attachment to an email) to limit the total number of emails received.

The contract documents for Contract No. 21-01 may be obtained from the City's web page at www.newarkde.gov/bids.

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

FEMA PRE-DISATER MITIGATION GRANT
PROGRAM REQUIREMENTS

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1. TERMINATION FOR CAUSE AND CONVENIENCE

a. All contracts in excess of $10,000 must address termination for cause and for convenience by the non-Federal entity, including the manner by which it will be effected and the basis for settlement. See 2 C.F.R. Part 200, Appendix II, ¶ B.

b. This requirement applies to all FEMA grant and cooperative agreement programs.

2. EQUAL EMPLOYMENT OPPORTUNITY

a. Except as otherwise provided under 41 C.F.R. Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 C.F.R. § 60-1.3 must include the equal opportunity clause provided under 41 C.F.R. § 60- 1.4(b), in accordance with Executive Order 11246**,** *Equal Employment Opportunity* (30 Fed. Reg. 12319, 12935, 3 C.F.R. Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, *Amending Executive Order 11246 Relating to Equal Employment Opportunity*, and implementing regulations at 41 C.F.R. Part 60 (Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor). See 2 C.F.R. Part 200, Appendix II, ¶ C.

b. Key Definitions

i. Federally Assisted Construction Contract. The regulation at 41 C.F.R. § 60- 1.3 defines a "federally assisted construction contract" as any agreement or modification thereof between any applicant and a person for construction work which is paid for in whole or in part with funds obtained from the Government or borrowed on the credit of the Government pursuant to any Federal program involving a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, or any application or modification thereof approved by the Government for a grant, contract, loan, insurance, or guarantee under which the applicant itself participates in the construction work.

ii. Construction Work. The regulation at 41 C.F.R. § 60-1.3 defines "construction work" as the construction, rehabilitation, alteration, conversion, extension, demolition or repair of buildings, highways, or other changes or improvements to real property, including facilities providing utility services. The term also includes the supervision, inspection, and other onsite functions incidental to the actual construction.

c. This requirement applies to all FEMA grant and cooperative agreement programs.

d. During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of

investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided*,* however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided,* That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with

a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

3. COPELAND ANTI-KICKBACK ACT

a. Compliance with the Copeland "Anti-Kickback" Act.

i. The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.

ii. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

iii. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12."

4. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

a. The regulation at 29 C.F.R. § 5.5(b) provides contract clause language concerning compliance with the Contract Work Hours and Safety Standards Act. FEMA suggests including the following contract clause:

Compliance with the Contract Work Hours and Safety Standards Act.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in

which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $26 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The City of Newark shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

5. DEBARMENT AND SUSPENSION

a. Non-Federal entities and contractors are subject to the debarment and suspension regulations implementing Executive Order 12549, *Debarment and Suspension* (1986) and Executive Order 12689, *Debarment and Suspension* (1989) at 2 C.F.R. Part 180 and the Department of Homeland Security's regulations at 2 C.F.R. Part 3000 (Nonprocurement Debarment and Suspension).

b. Requirements

i. These regulations restrict awards, subawards, and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for participation in Federal assistance programs and activities. See 2 C.F.R. Part 200, Appendix II, ¶ H; and 2 C.F.R. § 200.213. A contract award must not be made to parties listed in the SAM Exclusions. SAM Exclusions is the list maintained by the General Services Administration that contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549. SAM exclusions can be accessed at www.sam.gov. See 2 C.F.R. § 180.530.

ii. In general, an "excluded" party cannot receive a Federal grant award or a contract within the meaning of a "covered transaction," to include subawards and subcontracts. This includes parties that receive Federal funding indirectly, such as contractors to recipients and subrecipients. The key to the exclusion is whether there is a "covered transaction," which is any nonprocurement transaction (unless excepted) at either a "primary" or "secondary" tier. Although "covered transactions" do not include contracts awarded by the Federal Government for purposes of the nonprocurement common rule and DHS's implementing regulations, it does include some contracts awarded by recipients and subrecipients.

c. Suspension and Debarment

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by (**insert name of recipient/subrecipient/applicant**). If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (**insert name of recipient/subrecipient/applicant**), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180,

subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

6. PROCUREMENT OF RECOVERED MATERIALS

a. A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. See 2 C.F.R. Part 200, Appendix II, ¶ J; and 2 C.F.R. § 200.322.

(i) In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA -designated items unless the product cannot be acquired—
- Competitively within a timeframe providing for compliance with the contract performance schedule;
- Meeting contract performance requirements; or
- At a reasonable price.

(ii) Information about this requirement, along with the list of EPA- designated items, is available at EPA's Comprehensive Procurement Guidelines web site, https://www.epa.gov/smm/comprehensive- procurement-guideline-cpg-program.

(iii) The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act."

7. ACCESS TO RECORDS

a. All recipients, subrecipients, successors, transferees, and assignees must acknowledge and agree to comply with applicable provisions governing DHS access to records, accounts, documents, information, facilities, and staff. Recipients must give DHS/FEMA access to, and the right to examine and copy, records, accounts, and other documents and sources of information related to the federal financial assistance award and permit access to facilities, personnel, and other individuals and information as may be necessary, as required by DHS regulations *and* other applicable laws or program guidance. See DHS Standard Terms and Conditions: Version 8.1 (2018). Additionally, Section 1225 of the Disaster Recovery Reform Act of 2018 prohibits FEMA from providing reimbursement to any state, local, tribal, or territorial government, or private non-profit for activities made pursuant to a contract that purports to prohibit audits or internal reviews by the FEMA administrator or Comptroller General.

b. The following access to records requirements apply to this contract:

(1) The Contractor agrees to provide City of Newark, the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The Contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.

(4) In compliance with the Disaster Recovery Act of 2018, the City of Newark and the Contractor acknowledge and agree that no language in this contract is intended to prohibit audits or internal reviews by the FEMA Administrator or the Comptroller General of the United States.

ADDITIONAL FEMA RECOMMENDATIONS:

The Uniform Rules authorize FEMA to require additional provisions for non-Federal entity contracts. FEMA, pursuant to this authority, recommends the following:

RECOMMENDED PROVISIONS:

1. CHANGES

a. To be eligible for FEMA assistance under the non-Federal entity's FEMA grant or cooperative agreement, the cost of the change, modification, change order, or constructive change must be allowable, allocable, within the scope of its grant or cooperative agreement, and reasonable for the completion of project scope.

2. DHS SEAL, LOGO, AND FLAGS

a. The Contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.

3. COMPLIANCE WITH FEDERAL LAW, REGULATIONS, AND EXECUTIVE ORDERS

a. This is an acknowledgement that FEMA financial assistance will be used to fund all or a

portion of the contract. The contractor will comply with all applicable Federal law, regulations, executive orders, FEMA policies, procedures, and directives.

4. NO OBLIGATION BY FEDERAL GOVERNMENT.

a. The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

5. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS.

a. The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

GENERAL PROVISIONS

1. BIDS

Each bid shall be submitted on the proposal form included herein. The proposal and all other required documents must be submitted in a sealed envelope clearly identified with the bidder's name and marked "City of Newark - Contract No. 21-01, NORTHWEST BOOSTER STATION GENERATOR". **Bid Documents must be received in the Purchasing Office prior to 2:00 p.m. prevailing time, Tuesday February 16, 2021.** Each bid so submitted shall constitute an irrevocable offer for a period of thirty (30) calendar days following the bid opening date.

Alternatively, bids may also be emailed in PDF form to the City Purchasing Division at purchasing@newark.de.us by the deadline noted above and will be opened immediately after the closing date and time and will be publicly recorded in the Council Chamber shortly thereafter.

The scope of work consists of furnishing all materials and equipment and performing all labor necessary for the installation of the new natural gas generator including all associated material and equipment, an automatic transfer switch (ATS), new natural gas service, security fencing, landscaping, and delivery of three operation and maintenance (O&M) manuals to the City.

A non-mandatory pre-bid meeting will be held at the Northwest Booster Station located at 109 Delrem Drive, Newark DE 19711 on January 26, 2021 at 10:00 a.m. Perspective bidders are encouraged but not required to visit the site before submitting a bid. Failure to visit the site and observe existing conditions will in no way alleviate the Contractor from information that could be obtained from visiting the site. A bid bond equal to not less than 10% of the bid price must accompany the bid.

2. DEFINITIONS

A. *Agreement:* The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

B. *Contract Documents:* Those items so designated in the Agreement. Only printed or hard

copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

C. *Contractor:* The individual or entity with whom the Owner has entered into the Agreement.

D. *Engineer:* The Owner's consultant engineer. The Engineer for this project is City of Newark.

E. *Owner:* The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed. The Owner for this project is the City of Newark.

F. *Shop Drawings:* All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

G. *Site:* Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

H. *Subcontractor* – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

I. *Work:* The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, as required by the Contract Documents.

3. BID SECURITY

Each bid must be accompanied by a certified check, or cashier's check, or bid bond in the amount of 10 percent (10%) of the proposed bid price, payable to the City of Newark. Failure to provide the required bid security may be grounds for rejection of the bid.

If the successful bidder fails or refuses to execute and deliver the contract within twenty (20) calendar days after receiving notice of the award of the contract, the successful bidder shall forfeit to the City for such failure or refusal the security deposited with the bid. Any certified check or cashier's check submitted as security shall be returned to all unsuccessful bidders thirty

(30) calendar days after the bid opening date. The successful bidder shall provide the City with a Performance Bond and Payment Bond in the full amount of the contract guaranteeing faithful performance of the contract. Such bonds shall be provided to the City with the executed contract within twenty (20) calendar days after receiving notice of award of the contract. Upon receipt of the contract surety bond, the City will return any certified check or cashier's check submitted as bid security by the successful bidder.

4. TAXES

The price(s) quoted shall not include federal or state taxes. If applicable, the successful bidder shall provide the City with three (3) copies of the required tax exemption forms to accompany the bidder's invoice.

5. AWARDS

The City Manager or designee shall review each of the bids submitted and make a recommendation to the City Council on the disposition of the bids. The City Council reserves the right to accept or reject any or all bids or parts of bids as they may determine and to waive any irregularities or defects where the best interest of the City would be served.

6. BID PRICE

The bid price shall include all transportation, delivery, installation and all charges for the goods and services specified for the Northwest Booster Station Generator project. The Contractor will be held to have examined and be familiar with the entire Bid Specification prior to submitting their Bid Proposal. No allowance for additional compensation will be considered for failure to comply with this requirement.

7. TIME OF COMPLETION AND LIQUIDATED DAMAGES

The Contractor is to complete the work within One Hundred fifty (150) calendar days from the date specified by the City in a written "Notice to Proceed". Liquidated damages of five hundred dollars ($500.00) per day may be assessed to the Contractor by the City for each day the contract is extended beyond the completion date to provide recovery of costs. Liquidated damages are not to be construed as a penalty in any sense.

8. INTENT OF SPECIFICATIONS

It shall be the Contractor's responsibility to furnish the goods and services specifically indicated in the scope of work and specifications and such other as may be required to meet the intent of the specifications, drawings, or as may be necessary to provide the operation intended by the City.

9. EXCEPTIONS/DESCRIPTIVE INFORMATION

Any and all exceptions which are taken to the drawings and specifications must be noted in the space provided on the proposal. Any exception to the specifications may be grounds for rejection of the bid.

10. EQUALS

Where a specific product is specified by catalog or model number, the acceptability of any other "or equal" product shall be subject to the sole judgment of the City of Newark.

11. WARRANTIES AND STANDARDS

All goods are to be new and unused in all component parts, including all accessories. The specifications will be construed as the minimum required. When the manufacturer's standard exceeds the specifications, the standard units shall be furnished. All materials shall be free of defects. All standard manufacturer's warranties and guarantees shall apply to equipment and goods supplied under this contract.

The Contractor guarantees all of the work and materials for a period of one year, unless specifically stated as longer in the technical specifications or project plans after the date of completion and final acceptance by the City.

12. WORKMANSHIP

Workmanship will conform to the best current manufacturing practice followed for goods of this type. Component parts and units will be manufactured to definite standard dimensions with proper fit and clearances.

13. FINAL INSPECTION

All delivered goods and services will be subject to inspection by the City of Newark, Delaware. If in any way an item fails to meet the terms of the contract, it may be rejected or liquidated damage charges made. The decision of the City will be final and any rejected items or materials will have to be replaced at the expense of the vendor.

14. ADVERTISEMENTS

Any bidder submitting a bid will not use the name of the City in any advertisement without first obtaining the written consent of the City Manager.

15. EEO AND BUSINESS LICENSES

The bidder shall possess all required business or other licenses including a State of Delaware Business license and also shall be a fair and equal opportunity employer.

16. NONCOLLUSION

The bidder shall not, either directly or indirectly, enter into any agreement, participate in any collusion, or otherwise take any action in restraint of free competitive bidding in connection with the contract. Signed non-collusion statement shall be submitted with bid.

17. ADDENDA AND QUESTIONS

Any changes to the contract documents shall be made by written addenda, no later than four (4) calendar days prior to the bid opening date which may be issued with extensions to the bid submittal date if necessary, to allow adequate time for response. Bidders shall bear the entire responsibility for being sure they have received all such addenda. **Bidder is responsible for submitting a signed letter listing the addendums received for this contract.**

All questions/requests for information regarding this contract (bid process, drawings and technical specifications, etc.) must be submitted via email to purchasing@newark.de.us by 5:00 p.m. on Friday, January 29, 2021 to allow staff sufficient time to develop answers to questions deemed appropriate. Please submit all questions/requests for information in bulk (e.g., in a Word document attachment to an email) to limit the total number of emails received.

18. PAYMENT

No invoice will be processed for payment until the goods and/or services have been delivered and verification is made that the specifications under this contract have been met. Progress payments, when requested, will be evaluated and approved for payment based on work completed to date according to the approved schedule of values. Upon written request from the Contractor, payment for material stored on site may be made at 50% of the material's invoice price. Full payment will be made after the material is installed. Payment will be made within thirty (30) days of final acceptance by the City.

19. BIDDERS QUALIFICATIONS

No contract will be awarded to any bidder who in the judgment of the City is not a responsible bidder, or is not prepared with all the necessary experience, capital, organization, and equipment to conduct and complete the work for which the bidder proposes to contract.

EACH BIDDER SHALL SUBMIT WITH THE BID A LIST OF AT LEAST FIVE REFERENCES FOR COMPLETED PROJECTS OF SIMILAR SCALE AND SCOPE WHICH MUST INCLUDE CONTACT PERSON, AGENCY AND PHONE NUMBER.

20. LIABILITY INSURANCE

A. The Contractor shall at all times maintain and keep in force such insurance as will protect him from claims under Worker's Compensation Acts, and also such insurance as will protect him and the owner from any such claims for damages for personal injuries, including death, which may arise from operations under this contract, whether such operations be by the Contractor or by any Subcontractor or anyone directly or indirectly employed by any of them.

B. The Contractor shall be required to provide Workers' Compensation (WC)/Employer's Liability (EL) coverage with limits of insurance not less than:

$1,000,000 Per Accident
$1,000,000 Per Illness, Employee
$1,000,000 Per Illness, Aggregate

The Contractor shall be required to provide Contractors Professional Liability coverage with limits of insurance not less than:

$1,000,000 Per Claim
$1,000,000 Per Aggregate

The Contractor shall be required to provide Umbrella/Excess Liability coverage with limits of insurance not less than:

$3,000,000 Each Occurrence
$3,000,000 Aggregate

The Contractor shall be required to provide Commercial General Liability (CGL) coverage with limits of insurance not less than:

$1,000,000 Each Occurrence Limit
$1,000,000 Personal & Advertising Injury Limit
$2,000,000 Annual Aggregate Limit
$2,000,000 Products-Completed Operations Limit
$1,000,000 Business Auto Liability Limit (Owned, Hired, & Non-Owned Autos)

The Contractor, The City of Newark (Owner) and all other parties required of the Contractor shall be included as insured on the CGL, using Additional Insured Endorsements providing coverage as broad as the coverage provided for the named insured Subcontractor.

Subcontractors approved in association with the hiring of a Contractor shall be required to provide Commercial General Liability (CGL) coverage with limits of insurance in equal amount to those required of the Contractor.

All Contractors shall provide Contractors Pollution Liability with limits not less than:

Each Claim or Occurrence	$1,000,000
Annual Aggregate	$1,000,000

The Contractors Pollution Liability policy shall include coverage for Emergency Response Costs, Contingent Transportation, Non-Owned Disposal Sites, and Natural Resource Damage. If coverage is written on a claims-made basis, an Extended Reporting Period, or tail coverage, shall be provided for two (2) years following completion of the insured's services. In the alternative, the Contractors Pollution Liability policy shall be renewed for not less than two years following completion. The policy retroactive date shall be no later than the effective date of the Agreement.

C. A copy of the Certificate of Insurance must accompany each bid. The Prime Contractor's attention should be directed to other sections of the contract documents in the event additional insurance is required based on the scope of work.

21. ITEMS TO BE EXECUTED AND SUBMITTED WITH BID

Bidders are notified that the proposal, insurance documentation, and bid security must be executed and completed in full and submitted with the bid at the time of bidding, or bid may be subject to rejection.

The Contractor shall also submit the following with the bid:

A. List of Subcontractors and Qualifications
B. Exceptions or qualifications to the Contract Documents
C. Executed Bid Bond
D. Signed Compliance Statement
E. Acknowledgment of Addenda
F. Proposal
G. Insurance Documentation
H. Affidavit of Employee Drug Testing Program

22. ITEMS TO BE SUBMITTED WITH SIGNED CONTRACT

A. Construction Schedule
B. Performance Bond
C. Insurance Documentation
D. Payment Bond

23. RETAINAGE

The City will retain 5% of the progress payments until such time as the project is complete and accepted by the City.

24. INDEMNIFICATION

The Contractor shall solely be responsible and liable for the accuracy and completeness of all work performed and shall agree to indemnify, defend and hold harmless the City of Newark, its officers, agents and employees, from and against any and all claims, actions, suits and proceedings arising out of, based upon or caused by negligent acts, omissions or errors of or the infringement of any copyright of patent, by the contractor, its officers, agents, employees or subcontractors, in the performance of the contracted agreement.

25. TERMINATION OF AGREEMENT

This agreement may be terminated by the City upon thirty (30) days written notice if the contractor fails to perform satisfactorily in accordance with the terms and conditions of the contract. In the event this agreement is terminated, the contractor shall be paid for services satisfactorily rendered up to the termination date.

26. FAMILIARITY WITH PROPOSED WORK

A complete understanding of the conditions as they exist is required by careful personal examination of the work at the site. Each contractor bidding must completely satisfy himself as to the exact nature and existing conditions of the work area. The contractor also shall examine carefully the plans, specifications and the contract forms for the work contemplated. Failure to do so will not relieve the successful contractor of his obligation to carry out the provisions of the contract.

The contractor shall not, at any time after the execution of the contract, set up any claims whatsoever based upon insufficient data or incorrectly assumed conditions, nor shall claim any misunderstanding in regard to the nature, conditions or character of the work to be done under this contract, and shall assume all risks resulting from any change in the conditions which may occur during the progress of the work.

The Contractor is solely responsible to identify, obtain and pay for all required permits, licenses and approvals required by any and all State, local or Federal authorities or governmental agencies to complete the Work.

27. CONTRACTOR'S UNDERSTANDING

It is understood and agreed that the contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground; the character, quality and quantity of the material which will be required; the character of equipment needed preliminary to and during the prosecution of the work; the general and local conditions; all permit restrictions and conditions; and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent or employee of the City of Newark, either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

28. SAFETY REQUIREMENTS

The Contractor shall comply with the requirements and standards of the Occupational Safety and Health Act and all other state and local laws, ordinances and codes governing all work to be provided under the contract documents.

The Contractor shall maintain on-site and in all vehicles at all times spill response equipment appropriate for the types and quantities of fluids and/or materials that may be subject to spillage during the project. All discharges to the storm drainage system or surface waters are strictly prohibited. In the event that a spill reaches the storm drainage system and/or surface waters, the contractor shall notify the Public Works and Water Resources Department immediately at 302-366-7000. The Contractor will also be responsible for spill response and clean-up at no cost to the owner. If the Contractor fails to respond to and clean up a spill to the satisfaction of the owner, the owner will perform clean up and bill the Contractor for 150% of the personnel time and material expenses incurred by the City as necessary for the response.

29. RESTORATION OF DISTURBED AREAS AND CLEAN UP

Upon completion of the work, all related work, such as lawns, curbs, sidewalks, fences, shrubbery, and driveways that have been disturbed shall be restored to their original condition and in accordance with City of Newark Standards and Specifications. The area shall be cleared of all tools, equipment and refuse resulting from the project. The contractor shall, at the end of each day, leave the areas in which he has worked, free of debris and safely secure his material and equipment.

30. INSPECTION OF MATERIAL AND WORK

A. Workmanship shall be of good quality and all work and material shall be at all times subject to the inspection of the City of Newark or their duly authorized representatives. The contractor shall provide reasonable and necessary facilities for such inspection. If required by the City of Newark, the contractor shall take down or uncover portions of the finished work.

B. The contractor agrees that in case any of the material or work, or both, shall be rejected as defective or unsuitable by the city, material and the work shall be done again immediately to the satisfaction and approval of the city at the cost and expense of the contractor.

C. Any omission or failure on the part of the City of Newark or inspectors to disapprove or reject any defective work or materials shall not be construed to be an acceptance of any

defective work or material.

D. In case the City should not consider the defect of sufficient importance to require the contractor to replace any imperfect work or materials, the City shall have the power to make an equitable deduction from the stipulated price.

E. Neither the inspection nor supervision of the work, nor the presence or absence of an inspector shall relieve the contractor of any of his obligations under the contract or of making his work conform to the specifications.

31. DEBRIS COLLECTION AND DISPOSAL

The Contractor is responsible for collection, removal, transport and lawful disposal of construction debris and or materials.

32. OWNERSHIP OF MATERIAL

All documents prepared and submitted pursuant to this RFP or contract shall be property of the City upon submittal and will be subject to staff and public review and discussion in association with our public bidding and formal proposal process. Any information or documents deemed proprietary shall be so marked at time of submittal and limited to detail where the disclosure of contents could be prejudicial to competing offerors during the process of negotiation, and any commercial or financial information of a privileged or confidential nature.

33. FORCE MAJEURE OCCURRENCE

Upon the occurrence of a force majeure event, the City of Newark shall immediately notify the awarded vendor. In this instance, the City shall be excused from any further financial or contractual obligations for as long as such circumstances prevail. As used in this document, a "force majeure occurrence" means acts of God; acts of the public enemy; acts of the State and any other governmental entity in its sovereign or contractual capacity; fires; floods; epidemics or pandemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; unusually severe weather; or other unusual event outside of the reasonable control of a party hereto that prevents a party to this Agreement from performing its contractual obligations.

34. REGULATIONS AND EXCEPTIONS

The application of lead paint as defined in Title 16, Chapter 30M of State Code and Chapter 7 of City Code as part of this contract is prohibited. The contractor will be subject to fines as outlined

in State and City Code if it is determined that lead paint was applied in violation of State and City code.

Safety Data Sheet information for all paints applied to internal or external structures shall be provided to the City for review and approval prior to application. The contractor will be required to remove and remediate any lead paint to the satisfaction of the City, at no cost to the City. Prior to commencing removal and remediation efforts, the contractor shall provide a written remedial action plan which includes health safety protection requirements for both employees and the public for review and approval by the City and/or DNREC/DHSS. Any and all sample results that are generated as a result of improper application of lead paint shall be provided to the City within 5 working days of being received by the contractor. The contractor will also be required to replace all paint removed with non-lead paint to the satisfaction of the City, and at no cost to the City.

Failure to adequately remove, remediate, and replace lead paint applied in violation of State and City Code as outlined herein will be considered a breach of contract.

35. RELEASE OF LIENS

The Contractor is required to provide documentation stating that all liens filed against the Contractor have been paid before the final 5% retainage is released to the Contractor.

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

SCOPE OF WORK

1. SCOPE OF WORK

The Northwest Booster Station Generator project involves the installation of a new natural gas generator including all associated material and equipment, an automatic transfer switch (ATS), new natural gas service, security fencing, landscaping, and delivery of three operation and maintenance (O&M) manuals to the City. All work shall be performed in accordance with all Local, State, and Federal laws and regulations.

The drawings and specifications further define the scope of work. The Contractor shall furnish all required equipment, materials, and labor necessary for completion of the work described herein.

2. LOCATION

The project is spread throughout several locations within the City of Newark municipal boundary. Drawing 1 of the attached plans contains a location map displaying the point repair locations.

3. PERMITS, CERTIFICATIONS, LAWS AND ORDINANCES

The Contractor shall perform the work in accordance with all local, state and federal laws and ordinances.

The Contractor is required to have or obtain a City Contractor's License and State of Delaware business license prior to starting the work. The Contractor is required to obtain any permits required for completion of the work. The fees for City of Newark permits, if applicable, will be waived.

4. COORDINATION

A. Contractor shall coordinate construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Contractor shall coordinate its operations with operations that depend on each other for proper installation, connection, and operation.

B. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

C. Coordinate removal of different components with the Owner to ensure maximum performance and accessibility for required maintenance, service, and repair.

D. Coordinate with the City to detour pedestrian access through the project site.

5. SUBMITTALS

The Contractor shall submit an **electronic copy** of each submittal for review and approval by the Owner. Provide submittals in accordance with specifications. For scheduling purposes, the Contractor shall allow for a ten (10) business day review time by the Owner. Comments and Approvals will be returned in a digital format. The Contractor shall provide, at minimum, all submittals identified in the specifications. Each shop drawing shall contain only one work item and shall be consecutively numbered before submission. Additional submittals may be requested at the discretion of the Owner.

6. RESTORATION

The Contractor is responsible to restore all disturbed areas to original or better condition and remove all debris, residuals, trash, and excess materials from the sites.

7. SECURITY AND SITE ACCESS

The Contractor is responsible for security of his equipment and materials related to the work. The Contractor is responsible to maintain the work site in a safe and orderly manner.

Contractor is required to maintain a secure perimeter around each work area. Pedestrian walkways shall be always open except when they must be closed for construction purposes.

A. Driveways, Walkways and Entrances: Keep driveways and entrances clear and accessible

at all times. Do not use these areas for parking or storage of materials.

B. Schedule deliveries to minimize use of driveways and entrances by construction operations.

C. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

Prior to mobilization, the Contractor shall take a pre-construction video or photographs of any such areas to be used for access, staging, or work during the project and submit to the Owner. Video or photographs shall be used to document any existing damage or deteriorated conditions.

It shall be the responsibility of the contractor to obtain permission from any neighboring property owner if said contractor finds it necessary to enter upon or use in any manner the property of any neighbor for the expedition of the contractor's work.

8. WORK RESTRICTIONS

A. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work at the site to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated or approved by City of Newark.

C. Any and all work within a DelDOT right-of-way shall be in accordance with DelDOT work restrictions and traffic control requirements which may require nighttime work activity inside the right-of-way when impacting the travel lanes.

D. Weekend Hours: Weekend hours must be approved by the City. Contractor must submit request to work on weekends at least 5 business days in advance of the projected work date.

E. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than five days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

F. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption with Owner.
   1. Notify Owner not less than two days in advance of proposed disruptive operations.

2. Obtain Owner's written permission before proceeding with disruptive operations.

G. Controlled Substances: Use of tobacco products and other controlled substances on Project sites is not permitted. See Office of Management and Budget – Drug Testing Requirements for further information regarding controlled substances.

H. Contractor shall have contaminant spill response equipment readily available on-site during construction activity.

9. SITE CONSTRUCTION AND EXISTING UTILITIES

A. The Contractor is responsible to account for and consider existing site conditions and existing utilities. Prior to starting any work, the Contractor shall contact Miss Utility of Delmarva at 1-800-282-8555 for a utility mark out. The Contractor is responsible for locating and protecting existing utilities for the duration of the work.

B. The failure to show on the contract drawings any existing utilities shall not relieve the contractor of his responsibility in determining the locations of utilities.

D. Any damage done to existing utility lines, services, poles, and structures shall be repaired or

10. EXAMINATION OF SITE, DRAWINGS, ETC.

Before submitting proposals, bidders shall inform themselves fully of the nature of the work by a personal examination of the site and the drawings and by such other means as they may prefer or consider necessary, as to matters, conditions and considerations bearing on or in any way affecting the preparation of their proposals and the contract. They shall not, at any time after submission of the proposal, dispute the accuracy of such drawings or the specifications and the general conditions nor assert that there is any misunderstanding in regard to the location, extent or nature of the work to be performed.

11. STARTING DATE, SEQUENCE OF CONSTRUCTION & COMPLETION DEADLINE

The starting date of this contract will be as specified by the City in a written "Notice to Proceed." A preconstruction meeting shall be scheduled to finalize the sequence of construction. The final decision as to sequence of construction shall be that of the Owner.

12. SUPERVISION OF WORK AND COORDINATION

The Contractor shall supervise the work and shall secure full cooperation of all subcontractors, if any, to complete the work with a minimum interference from the operating personnel of the Owner.

13. COORDINATION WITH THE OWNER

The Contractor shall coordinate all activities with the Owner. The Contractor shall provide the City with reasonable time to respond to requests for information and for coordination.

14. INSPECTION OF MATERIAL AND WORK

A. Workmanship shall be of good quality and all work and material shall be at all times subject to the inspection of the City of Newark or their duly authorized representatives. The contractor shall provide reasonable and necessary facilities for such inspection. If required by the City, the contractor shall take down or uncover portions of the finished work.

B. The contractor agrees that in the event that any of the material or work, or both, shall be rejected as defective or unsuitable by the City, the material shall be replaced and the work shall be done again immediately to the satisfaction and approval of the City at the cost and expense of the Contractor.

C. Any omission or failure on the part of the City of Newark or its inspectors to disapprove or reject any defective work or materials shall not be construed to be acceptance of any defective work or material.

D. Contractor and City Inspector must agree on additional work required outside of the contract documents. A daily time and material log for all additional work shall be supplied by the contractor and signed by the City Inspector.

15. PROTECTION TO PUBLIC AND PROPERTY

A. The contractor shall insure protective measures to the general public and to occupants of property along and adjacent to the work area.

B. The contractor is responsible for any and all damage or injury of any kind which directly or indirectly may be done to any property or sustained by any persons during the execution of the work.

C. If any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the work, the contractor shall restore at his own expense such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

16. SAFETY PRECAUTIONS

A. The Contractor shall execute work under this contract with the utmost concern for the safety of the general public. All areas worked upon and subject to travel by the public shall be identified with the proper warning indicators and signs during the working period. Upon completion of the contract or when such areas are reopened to public travel, they shall be rendered in a safe condition using either temporary or permanent repair material as the case may be. No private driveway shall be blocked or closed without the property owner being notified and obtaining their agreement.

B. Streets, roads and driveways used by the contractor for access to and from the work site shall be protected from damage in excess of that caused by the normal traffic of vehicles used for or in connection with construction work. Any such damage done shall be repaired immediately and left in good condition at the end of the construction period and shall be repaired at the contractor's expense.

17. RIGHT-OF-WAY

All operations shall be confined to the assigned work area. The City will provide no right-of-way over other properties. The contractor shall take every precaution to minimize the inconvenience to the owners or tenants of adjacent property. Public roads shall not be obstructed in such a way as to cut off traffic. The contractor shall, at his own expense, repair any damage or injury to either public or private property during the progress of the work.

18. TRAFFIC CONTROL AND ROAD SIGNS

A. The contractor shall be responsible for traffic control for the duration of the project, as needed, and shall coordinate traffic control plans and obtain necessary permits from the Owner for work on city-owned roads. The contractor shall be responsible for removal and re-installation of all signs in the work area. Signs necessary for the safe movement of traffic shall be maintained in operation during construction. Any other signs shall be properly stored by the Contractor, who shall be responsible for them. All signage shall comply with the current Manual on Uniform Traffic Control Devices (MUTCD).

B. The Contractor shall provide notice to the City seven (7) calendar days in advance of any planned road or entrance closure. All closures shall be at the discretion of the City.

19. JOB SITE MAINTENANCE, RESTORATION AND CLEANUP

The contractor is responsible to restore all disturbed areas to original or better condition and remove all debris, residuals, trash, and excess materials from the site. The contractor is required to keep the work area clean during construction and remove trash as it accumulates. Roads shall be kept clean and free of mud, debris and dirt. At the direction of the City Inspector, the contractor is responsible for the cost of street sweeping and maintenance required for upkeep of clean road surfaces.

20. DRAWINGS

Project Drawings are included as Attachment 1.

21. BID ITEMS

Bidders must provide prices on the Proposal form including all adjustment bid items. The Owner reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the Proposal if such additions and/or deletions are made to quantities.

22. BASIS OF PAYMENT

Payment for these items shall be included in the unit prices for each item as described in the Proposal. All other items, methods, and materials necessary to complete the work described in each pay item shall be incidental to the bid item the work is being completed under.

23. METHOD OF MEASUREMENT AND INCIDENTALS DETERMINATION

The measurement of payment shall be for the installation or removal of the materials listed in the Proposal in accordance with the units indicated as Lump Sum (LS) complete and accepted by Owner. All work required to complete the work outlined in the proposal shall be incidental to the unit cost provided for the item the work is being conducted under.

1. Generator Installation: The lump sum cost for mobilization and demobilization, excavation, installation of a natural gas generator, concrete generator pad, conduits, conductors, ornamental fence, automatic transfer switch (ATS), landscaping, erosion and sediment control measures, and any other appurtenances and measures required to complete all scope of work items.

24. AVAILABLE BACKGROUND INFORMATION

Construction plans provided in the Appendix form a part of this Bid Specification to the extent referenced and provide detailed information about the Project Location, and existing conditions of the site(s). The documentation is provided for informational purposes only and for the sole use of the Contractor. The City makes no claims as to the correctness or accuracy of the data provided therein. The Contractor shall review and determine for themselves the correctness and accuracy of the information before incorporating and relying on the prior work as part of their work product to the City.

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01
NORTHWEST BOOSTER STATION GENERATOR
PROPOSAL

To: The Mayor and City Council
Newark, Delaware

From:_____

The undersigned as a lawfully authorized agent for the below named bidder has carefully examined the Bid Documents to be known as Contract No. 21-01 and binds himself on award to him by the Mayor and City Council of Newark, Delaware to execute in accordance with such award, a contract of which this Proposal and said General Provisions and Specifications and any Addenda shall be a part, and to furnish the goods as specified F.O.B. Newark, Delaware in a manner that is in complete accordance with said General Provisions and Specifications at the following named unit price on or before the delivery period stated below:

Bid Item	Description	Unit	Bid Qty.	Unit Price	Item Total
1	Installation of New Natural Gas Generator, Automatic Transfer Switch, and all other materials and appurtenances	LS	1		
				Total for Bid Items 1	

Project to be Completed by _____

DATE: _____ BIDDER: _____

By: _____
Legally authorized representative

PRINT NAME: _____

TITLE: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

TELEPHONE: _____

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

BOND TO ACCOMPANY PROPOSAL

(Not Necessary if Certified or Cashier's Check is Used)

KNOW ALL MEN BY THESE PRESENTS THAT _____ of _____ _____ in the County of _____ and State of _____ _____ Principal, and _____ of _____ _____ as surety, legally authorized to do business in the State of Delaware, are held and firmly bound unto the City of Newark in the sum of _____ _____ Dollars, to be paid to said City of Newark for use and benefit of the Mayor and Council of Newark, for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators and successors, jointly and severally, for and in the whole, firmly by these presents. Sealed with our seals, dated the _____ day of _____ _____ in the year of our Lord, two thousand and twenty one (2021).

NOW THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that if the above bound principal _____ _____ who has submitted to said City of Newark, a certain proposal to enter into a certain Contract No. 21-01, Northwest Booster Station Generator, shall be awarded said Contract, and if said _____ shall well and truly enter into and execute said contract and furnish therewith such surety bond or bonds as may be required by the terms of said contract and approved by said City of Newark, said

contract, and said bond to be entered into within twenty (20) days after the date of official notice of award thereof in accordance with the terms of said proposal, then this obligation to be void, otherwise shall remain in full force and virtue.

SIGNED AND SEALED IN THE PRESENCE OF WITNESS:	SIGNED: _____ (SEAL)
	BY: _____ (SEAL)
_____	SIGNED: _____ (SEAL)
	BY: _____ (SEAL)

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWEST BOOSTER STATION GENERATOR

NON-COLLUSION STATEMENT

Date: _____

City of Newark
Newark, Delaware

This is to certify that the undersigned bidder _____ has not, either directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted to the City of Newark on the _____ day of _____, 20___.

Signature of Bidder: _____

By: _____
Its legally authorized representative

Sworn to and subscribed before me on this _____ day of _____ 20___.

My Commission expires _____

_____
Notary Public

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWES BOOSTER STATION GENERATOR

SPECIFICATION FOR THE ELECTRICAL GENERAL PROVISIONS

GENERAL

1. SUMMARY

A. The General Conditions, Special Conditions, General Requirements and Drawings are hereby made a part of this Section as fully as if repeated herein. Contractor shall consult these sections in detail as he will be responsible for and governed by conditions set forth therein and work indicated.

B. Attention is directed to other sections of the specifications, which affect the work under this section.

2. JOB CONDITIONS

A. The Contractor shall visit the sites and familiarize himself with all existing and limiting conditions that have a bearing on his work. Failure to do so will not relieve him of any subsequent responsibilities pertinent to this project.

B. The Contractor shall be responsible for familiarizing himself with the civil and electrical drawings for the project. All power and control wiring and raceways shall be provided for the project.

3. PERMITS AND INSPECTIONS

A. Permits and licenses necessary for the execution of this work shall be secured and paid for by the Contractor.

B. Contractor shall arrange for all inspections specified herein or required by all agencies having jurisdiction and furnish required certificates of inspection to Owner, including electrical certificate from State licensed agency.

4. CODES AND STANDARDS

A. The installations shall conform to all applicable codes and standards. The construction of the systems indicated and called for in these specifications shall be performed in accordance with practices, except as otherwise indicated or specified. The Contractor shall be responsible for obtaining the necessary information to comply with these requirements. Any modification of the drawings or specifications that may be necessary to meet these requirements must be approved by the Engineer or authorized representative before they are made.

B. The Contractor shall give all notices and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the drawings and/or specifications are at variance therewith, he shall promptly notify the Engineer in writing of any necessary changes of work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, codes, rules and regulations without first providing written notice to the Project Engineer, the Contractor shall bear all costs arising from same.

C. Requirements of the following organizations shall be considered minimum:

1. National Electrical Code
2. National Electrical Safety Code
3. Local Utility Company
4. OSHA
5. Local City and County Codes

5. ELECTRICAL ABBREVIATIONS, REFERENCES AND DEFINITIONS

A. Abbreviations and symbols herein and on Drawings are in accordance with ANSI Standard Y1.

B. References to technical societies, trade organizations and governmental agencies in the Electrical Division are in accordance with the following:

1. ANSI - American National Standards Institute
2. ASTM - American Society for Testing Material
3. IEEE- Institute of Electrical and electronics Engineers, Inc.
4. NEC - National Electrical Code
5. NEMA - National Electrical Manufacturers Association
6. NFPA - National Fire Protection Association
7. OSHA – Occupational Safety and Health Administration
8. UL - Underwriters' Laboratories, Inc.

C. The following definitions of terms and expressions are applicable to the Electrical Division.

1. "Provide" shall mean "furnish and install."
2. "Herein" shall mean "contents of a particular Division" where this term appears.
3. "Indicated" shall mean "indicated on Contract Drawings."
4. "Equal" shall mean "approved equivalent."
5. "Contractor" shall mean "Contractor or subcontractor for work described."

6. TESTS

A. Arrange and pay for all tests. Notify Engineer three (3) working days before tests are made. Conduct tests in presence of Engineer or authorized representative. Repeat tests after defects are corrected.

B. Prior to tests, provide feeders and branch circuits continuous from main distribution panels to outlets, fixtures, and equipment.

1. Demonstrate system is free from short circuits and properly grounded.
2. Test lighting circuits for correct operation after lamps are installed.
3. Check all motors for correct rotation.
4. Test load balance as specified herein.

7. SYSTEM OPERATION INSTRUCTIONS

A. Verbal Instruction

1. After all tests and adjustments, Contractor shall instruct attendant or Owner's representative in all details of operation of distribution.
2. Supply attendants to operate the systems until Engineer is satisfied that the systems have been installed in accordance with these Drawings and Specifications and are functioning properly.
3. Provide services and equipment manufacturer's engineer to instruct representative of Owner in operation and maintenance of Electrical equipment.

B. Written Instruction

1. Provide two (2) copies of printed instructions and diagrams covering operation and maintenance of each item of equipment.
2. Instructions furnished in bound covers and posted at locations designated by Engineer or authorized representative.

8. LAYOUTS

A. Electrical system layouts indicated are generally diagrammatic and location of outlets and equipment is approximate; exact routing of raceways, locations of outlets and equipment shall be governed by structural conditions and obstructions. The Contractor shall be responsible for the exact layout of all equipment. This is not to be construed to permit redesigning systems; all outlets and equipment shall be interconnected as indicated. Locate and install equipment requiring maintenance and operation so that it will be readily accessible. Any relocation of outlets or equipment must be approved by the Engineer or authorized representative before erection. The right is reserved to make any reasonable change in location of outlets and equipment prior to "roughing-in" without involving additional cost.

B. Coordinate the installation of any wiring, raceways, outlet boxes, sleeves, anchors, and other concealed or embedded items so that this work is properly in place before concrete or partitions are in place.

9. SHOP DRAWINGS

A. The Contractor shall submit within 30 days after the award of the contract a list of materials required for the project. This list shall be complete and include all items or systems called for in this contract. Partial lists submitted from time to time will not be acceptable. The list shall identify the specific item, manufacturer, and vendor. Vendor information only will not be acceptable.

B. After approval of the material list, the Contractor shall secure descriptive drawings or catalog cuts of equipment to be furnished under this contract. He/She shall review these Shop Drawings for conformance to contract documents prior to submission for approval. No equipment shall be ordered until they have been approved.

C. Shop Drawings shall be in accordance with General Conditions of these Specifications.

D. All Shop Drawing submittals shall have the following identification data, as applicable, contained therein or permanently adhered thereto.

1. Project name
2. Project number
3. Subcontractor's Vendor's and/or Manufacturer's name and address
4. Product identification
5. Applicable contract drawings and specifications section number

6. Shop Drawing title, drawing number, revision number, and date of drawing and revision.

10. SUBSTITUTES

A. Manufacturers' names and catalog numbers of materials and equipment are given to describe type, quality and design of material and equipment required. Where possible three (3) or more manufacturers are listed.

B. Where materials or manufacturers are specified and where the words "or equal" or "approved equal" are not used, only those specified shall be furnished and installed.

11. MATERIALS AND EQUIPMENT REQUIREMENTS

A. Provide materials and equipment conforming to those specified herein. Manufacturers' names and catalog numbers are given to describe type, quality and design of material and equipment required.

B. All material and equipment shall conform to capacity, efficiency, design and material specified and shall meet dimension and space requirements. Sizes of materials and equipment indicated or specified are minimum requirements. The Contractor may use larger sizes to expedite the work provided that such change meets space requirements and does not result in additional installation, maintenance or operating cost to the Owner. Equipment or materials of the same type or classification, used for the same purpose, shall be the products of the same manufacturer.

C. All materials shall be new, of the best of their respective kind and shall conform to accepted standards of the trade in every case where such a standard has been established for the particular type of material in question. Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with applicable technical standards and specification of societies, organizations and/or agencies listed herein, suitable for maximum working pressure and shall have neat and finished appearance.

D. Materials and appliances of types for which there are UL standard requirements, listings or labels shall have such listing of UL, be so labeled, and shall conform to their requirements.

E. In all cases where a device or part of the equipment is herein referred to in the singular number, it is intended that such reference shall apply to as many such items as are required to complete the installation.

F. Contractor shall, without charge, replace any work or material, which develop defects, except ordinary wear and tear, or fail to perform satisfactorily, within one (1) year from the date of final acceptance.

PRODUCTS

Not Applicable

EXECUTION

Not Applicable

END OF SECTION

CITY OF NEWARK
Delaware

CONTRACT NO. 21-01

NORTHWES BOOSTER STATION GENERATOR

SPECIFICATION FOR THE STAND-BY POWER SYSTEM

1. SCOPE OF WORK

The Scope of Work consists of furnishing all materials and equipment and performing all labor necessary for the installation of the new natural gas generator including all associated material and equipment, an automatic transfer switch (ATS), new natural gas service, security fencing, landscaping, and delivery of three operation and maintenance (O&M) manuals to the City. All work shall be performed in accordance with all Local, State, and Federal laws and regulations. The work shall also include replacing of the necessary pavements, curbs, curb ramps, and sidewalks, topsoil and seeding and the cleaning away of all rubbish and surplus material, and the furnishing of all material and tools, implements and labor required furnish and install in complete working order the new generator.

2. CODES AND STANDARDS

A. The generator set installation and on-site testing shall conform to the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.

1. CSA 282, 1989 Emergency Electrical Power Supply for Buildings
2. IEEE446 – Recommended Practice for Emergency and Stand-by Power Systems for Commercial and Industrial Applications
3. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
4. NFPA110 – Emergency and Stand-by Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 - prototype tests required by this standard shall have been performed on a complete and functional unit; component level type tests will not substitute for this requirement.

B. The generator set and supplied accessories shall meet the requirements of the following standards:

1. NEMA MG1. Alternator shall comply with the requirements of the current version this

standard as they apply to AC alternators.
2. UL1236 – Battery Chargers
3. UL2200. The generator set shall be listed to UL2200 or submit to an independent third-party certification process to verify compliance as installed.

C. The control system for the generator set shall comply with the following requirements.

1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.
3. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
4. FCC Part 15, Subpart B.
5. IEC8528 part 4. Control Systems for Generator Sets
6. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
7. UL508. The entire control system of the generator set shall be UL508 listed and labeled.
8. UL1236 – Battery Chargers.

D. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:

1. CSA 282, Emergency Electrical Power Supply for Buildings

2. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.

3. NFPA110 – Emergency and Stand-by Power Systems. The transfer switch shall meet all requirements for Level 1 systems.

4. IEEE446 – Recommended Practice for Emergency and Stand-by Power Systems for Commercial and Industrial Applications.

5. NEMA ICS10-1993 – AC Automatic Transfer Switches.

E. The automatic transfer switch assembly shall comply with the following standards:

1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN55011, Class B Radiated Emissions
3. EN55011, Class B Conducted Emissions
4. IEC 1000-4-5 (EN 61000-4-5); AC Surge Immunity.
5. IEC 1000-4-4 (EN 61000-4-4) Fast Transients Immunity

6. IEC 1000-4-2 (EN 61000-4-2) Electrostatic Discharge Immunity
7. IEC 1000-4-3 (EN 61000-4-3) Radiated Field Immunity
8. IEC 1000-4-6 Conducted Field Immunity
9. IEC 1000-4-11 Voltage Dip Immunity.
10. IEEE 62.41, AC Voltage Surge Immunity.
11. IEEE 62.45, AC Voltage Surge.
12. UL1008 – Transfer Switches. Transfer switches shall be UL1008 listed. UL1008 transfer switches may be supplied in UL891 enclosures if necessary to meet the physical requirements of the project.

F. The generator and automatic transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

3. SUBMITTALS

A. Consult Scope of Work section and Electrical General Provisions for shop drawing requirements.

4. WARRANTY

A. The generator set and associated equipment shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.

B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc.

C. Warranty shall cover both the generator set and ATS.

5. MANUFACTURER

A. The engine, generator, automatic transfer switch and all major items of the auxiliary equipment shall be manufactured in the U.S. by a manufacturer currently engaged in the production of such equipment. The unit shall be factory assembled and tested by the engine manufacturer and shipped to the job site by his authorized dealer having a parts and service facility within a 100-mile radius.

1. Specified Generator: Cummins Model C80N6
2. Specified Alternator: Cummins (BB94-2)

3. Specified Enclosure: Cummins (F216-2)
4. Specified ATS: OTPC Transfer Switch
5. Subject to compliance with the specifications, alternate manufacturers for the generator are Caterpillar and Cummins, with the equivalent automatic bypass type ATS.

B. Only approved bidders shall supply equipment provided under this contract. Equipment specifications for this project, including alternates, are as indicated above. Any other alternate shall be submitted to the Engineer in writing 10 days prior to the bid date for consideration.

6. POWER GENERATOR

A. Natural Gas Engine-Generator Set: 4-cycle, 1800 rpm. Generator set rating - 80 kW, 100 kVA at 0.8 PF, stand- by rating; System voltage – 240delta/120 Volts AC, three-phase, four-wire, 60 hertz.

1. Prototype Tests and Evaluation: prototype tests shall have been performed on a complete and functional unit; component level type tests will not substitute for this requirement. Prototype testing shall comply with the requirements of NFPA 110 for level 1 system.

2. Performance
   a. Voltage regulation shall be +/-0.5 percent for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load shall not exceed +/-0.5 percent.
   b. Frequency regulation shall be isochronous from steady state no lead to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed +/-0.5 percent.
   c. The engine-generator set shall accept a single step load of 100% nameplate kW and power factor, less applicable de-rating factors, with the engine-generator set at operation temperature.
   d. Motor starting capability shall be a minimum of 306 kVA. The generator set shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set. Maximum voltage dip on application of this load, considering both alternator performance and engine speed changes shall not exceed 25%.
   e. The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic, and no 3rd order harmonics or their multiples. Telephone influence factor shall be less than 40.
   f. The generator set shall be certified by the engine manufacturer to be suitable for

use at the installed location and rating, and shall meet all applicable exhaust emission requirements at the time of commissioning.

3. Construction
   a. The engine-generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.
   b. All switches, lamps, and meters in the control system shall be oil-tight and dust-tight. All active control components shall be installed within a UL/NEMA 3R enclosure. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts.

4. Connections
   a. The generator set load connections shall be composed of silver or tin plated copper bus bars, drilled to accept mechanical or compression terminations of the number and type as shown on the drawings. Sufficient lug space shall be provided for use with cables of the number and size as shown on the drawings.
   b. Power connections to auxiliary devices shall be made at the devices, with required protection located at a wall-mounted common distribution panel.
   c. Generator set control interfaces to other system components shall be made on a permanently labeled terminal block assembly. Labels describing connection point functions shall be provided.

B. Engine and Engine Equipment: The engine shall be natural gas, turbocharged, 8 cycle, radiator and fan cooled. Two cycle engines are not acceptable. Engine accessories and features shall include:

1. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed. The governing system shall include a programmable warm up at idle and cooldown at idle function. While operating in idle state, the control system shall disable the alternator excitation system. Natural gas fuel supply pressure, measured at the generator set fuel inlet downstream of any fuel system equipment accessories shall be within the operating range of 1.74-2.74 kPa (7.0-11.0 in. H2O).

2. Skid-mounted radiator and cooling system rated for full load operation in 122 degrees F (50 degrees C) ambient as measured at the alternator air inlet. Radiator fan shall be suitable for use in a system with 0.5 in H2O restriction. Radiator shall be sized based

on a core temperature that is 20F higher than the rated operation temperature, or prototype tested to verify cooling performance of the engine/radiator/fan operation in a controlled environment. Radiator shall be provided with a duct adapter flange. The equipment manufacturer shall fill the cooling system with a 50/50- ethylene glycol/water mixture prior to shipping. Rotating parts shall be guarded against accidental contact.

3. Electric starter(s) capable of three complete cranking cycles without overheating.

4. Positive displacement, mechanical, full pressure, lubrication oil pump.

5. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator. An engine driven, mechanical, positive displacement fuel pump. Fuel cooler, suitable for operation of the generator set at full rated load in the ambient temperature specified shall be provided if required for operation due to the design of the engine and the installation.

6. Replaceable dry element air cleaner with restriction indicator.

7. Flexible supply and return fuel lines.

8. Engine mounted battery charging alternator, 40-ampere minimum and solid-state voltage regulator.

9. Coolant heater
   a. Engine mounted thermostatically controlled, coolant heater for the engine. Heater voltage shall be as shown on the project drawings. The coolant heater shall be UL499 listed and labeled.
   b. The coolant heater shall be installed on the engine with silicone hose connections. Steel tubing shall be used for connections into the engine coolant system wherever the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall provisions to isolate the heater for replacement of the heater element without draining the coolant from the generator set. The quick disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.
   c. The coolant heater shall be provided with a DC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.
   d. The coolant heater(s) shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 104F (40C) in a 40F (4C) ambient, in compliance with NFPA110 requirements, or the temperature required for starting and load pickup requirements of this specification.

10. Provide vibration isolators, spring/pad type, quantity as recommended by the generator set manufacturer. Isolators shall include seismic restraints if required by site location.

11. Starting and Control Batteries shall be calcium/lead antimony type, 24 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors. The batteries shall be capable of a minimum of three complete 15-second cranking cycles at 40F ambient temperature when fully charged.

12. Provide exhaust silencer of size and type as recommended by the generator set manufacturer and approved by the engine manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed according to the engine manufacturer's recommendations and applicable codes and standards. A full port ball valve shall be connected to the condensate drain outlet.

13. Provide a minimum 12-amp battery charger for each generator set battery bank. Generator sets incorporating two battery banks shall be provided with two chargers connected together and operating in parallel, with alarm output(s) connected in parallel. The charger(s) shall include the following capabilities:
    a. Chargers shall be UL 1236-BBHH listed and CSA or CUL certified for use in emergency applications.
    b. The charger shall be compliant with UL991 requirements for vibration resistance.
    c. The charger shall comply with the requirements of EN61000-4-5 for voltage surge resistance; EN50082-2 for immunity; EN61000- 4-2 for ESD; EN61000-4-3 for radiated immunity; ANSI/IEEE C62.41 category B and IN61000-4-4 for electrically fast transient; EN61000-4-6 for conducted emissions; and FCC Part 15 Class A for radiated emissions.
    d. The charger shall be capable of charging a fully discharged battery without damage to the charger. It shall be capable of returning a fully discharged battery to fully charged condition within 24 hours. The charger shall be UL-labeled with the maximum battery amp-hour rating that can be recharged within 24 hours. The label shall indicate that the charger is suitable for charging of 200AH batteries per NFPA requirements.
    e. The charger shall incorporate a 4-state charging algorithm, to provide trickle charge rate to restore fully discharged batteries, a bulk charge rate to provide fastest possible recharge after normal discharge, an absorption state to return the battery to 100 percent of charge, and a float stage to maintain a fully charged battery and supply battery loads when the generator set is not operating. In addition, the charger shall include an equalization timer. Charge rates shall be temperature compensated based on the temperature directly sensed at the battery.
    f. The DC output voltage regulation shall be within plus or minus 1%. The DC output

ripple current shall not exceed 1 amp at rated output current level.

g. The charger shall include the following features:
   i. Two line alphanumeric display with programming keys to allow display of DC output ammeter and voltmeters (5% accuracy or better), display alarm messages, and perform programming;
   ii. LED indicating lamp(s) to indicating normal charging condition (green), equalize charge state (amber) and fault condition (red);
   iii. AC input overcurrent, over voltage, and undervoltage protection;
   iv. DC output overcurrent protection;
   v. Alarm output relay;
   vi. Corrosion resistant aluminum enclosure

C. AC Alternator

1. The AC alternator shall be; salient-pole, brushless, 2/3-pitch, 12 lead, self-ventilated with drip-proof construction and amortisseur rotor windings and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1- 32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to Standby 130 degrees Celsius. The excitation system shall be of brushless construction controlled by a solid-state voltage regulator capable of maintaining voltage within +/- 2.0% at any constant load from 0% to 100% of rating. The AVR shall be capable of proper operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operation. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.
2. The alternator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.
3. The generator shall be inherently capable of sustaining and regulating at least 250% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
4. The alternator shall have a single maintenance- free bearing, designed for 400,000 hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
5. The subtrainsient reactance of the alternator shall not exceed 12 percent, based on the stand-by rating of the generator set.
6. Provide anti-condensate heaters for the alternator

D. Engine-Generator Set Control

1. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and

control of the generator set, and remote monitoring and control as described in this specification. A network module shall be provided for communications with the remote annunciator.

2. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.
3. The control shall be UL508 listed, CSA282-M1989 certified, and meet IEC8528 part 4. All switches, lamps and meters shall be oil-tight and dust-tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts. The controls shall meet or exceed the requirements of Mil-Std 461C part 9, and IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions. The entire control shall be tested and meet the requirements of IEEE587 for voltage surge resistance.
4. The generator set mounted control shall include the following features and functions:
   a. Control Switches
      i. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
      ii. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.
      iii. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
      iv. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

   b. Generator Set AC Output Metering: The generator set shall be provided with a metering set including the following features and functions:
      i. Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.
      ii. Analog voltmeter, ammeter, frequency meter, power factor meter and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Meter scales shall be color coded in the following fashion: green shall indicate normal operating condition, amber shall indicate operation in ranges that indicate potential failure, and red shall indicate failure impending. Metering accuracy shall be within 1% at

rated output. Both analog and digital metering are required.

iii. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.

iv. The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.

c. Generator Set Alarm and Status Message Display:

i. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:

- The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).
- The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.
- The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
- The control shall include an amber common warning indication lamp.

ii. The generator set control shall indicate the existence of the warning and shutdown conditions on the control panel. All conditions indicated below for warning shall be field-configurable for shutdown. Conditions required to be annunciated shall include:

- low oil pressure (alarm)
- low oil pressure (shutdown)
- oil pressure sender failure (alarm)
- low coolant temperature (alarm)
- high coolant temperature (alarm)
- high coolant temperature (shutdown)
- engine temperature sender failure (alarm)
- lowcoolant level (alarm or shutdown--selectable)
- fail to crank (shutdown)
- overcrank (shutdown)
- overspeed (shutdown)
- low DC voltage (alarm)
- high DC voltage (alarm)
- weak battery (alarm)

- low fuel (alarm)
- tank leak detection (alarm)
- high AC voltage (shutdown)
- low AC voltage (shutdown)
- under frequency (shutdown)
- over current (warning)
- over current (shutdown)
- short circuit (shutdown)
- ground fault (warning)
- over load (alarm)
- emergency stop (shutdown)
- (4) configurable conditions

iii. Provisions shall be made for indication of two customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

iv. Engine Status Monitoring:

The following information shall be available from a digital status panel on the generator set control:

- Engine oil pressure (psi or kPA)
- Engine coolant temperature (degrees F or C)
- engine oil temperature (degrees F or C)
- engine speed (rpm)
- number of hours of operation (hours)
- number of start attempt
- battery voltage (DC volts)
- The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the stand-by rating of the generator set

v. Control Functions:

- The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
- The control system shall include an idle mode control, which allows the engine

to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.

- The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
- The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
- The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature, which is capable of discriminating between failed senders or wiring components, and an actual failure conditions.

vi. Alternator Control Functions:

- The generator set shall include a full wave automatic digital voltage regulation system that is matched and prototype tested with the governing system provided. It shall be immune from misoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below a threshold of [58-59] HZ. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alpha-numeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.
- A microprocessor-based protection device shall be provided to individually monitor all phases of the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The device shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445.
- A microprocessor-based protection device shall be provided to monitor all phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445.

- Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
- A microprocessor-based AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds. The system shall monitor individual phases and be connected line to neutral on 3- phase 4-wire generator sets, and for systems that are solidly grounded.
- The generator set control shall include a 120VAC-control heater.

vii. Other Control Functions

- The generator set shall be provided with a network communication module to allow LonMark compliant communication with the generator set control by remote devices. The control shall communicate all engine and alternator data, and allow starting and stopping of the generator set via the network in both test and emergency modes.
- A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 25VDC or more than 32 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.

viii. Control Interfaces for Remote Monitoring:

- The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown, (4) load shed command.
- A fused 10 amp switched 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
- A fused 10 amp 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.
- The control shall be provided with a direct serial communication link for the LonWorks communication network interface.

E. Generator Set Auxiliary Equipment and Accessories

1. Generator Set Main Circuit Breaker:

   Generator main circuit breaker: set mounted and wired, UL listed, molded case with electronic trip unit 100% rated at 250A/3-Pole/600Vac. Submittals shall demonstrate that the circuit breaker setting provides proper protection for the alternator by a comparison of the trip characteristic of the breaker with the thermal damage characteristic of the alternator. The supplier shall submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided.

2. Outdoor Weather-proof Enclosure:

   a. The generator set shall be provided with an outdoor enclosure, with the entire package listed under UL2200. The package shall comply with the requirements of the National Electrical Code for all wiring materials and component spacing. The total assembly of generator set, enclosure, and sub-base fuel tank shall be designed to be lifted into place using spreader bars. Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 122F. The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall be lockable, and include retainers to hold the door open during service. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to limit access of rodents into the enclosure. All electrical power and control interconnections shall be made within the perimeter of the enclosure.

   b. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer's standard color using a two step electro-coating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating that meets the following requirements:
      - Primer thickness, 0.5-2.0 mils. Top coat thickness, 0.8-1.2 mils.
      - Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.
      - Crosshatch adhesion, per ASTM D3359-93, 4B-5B.
      - Impact resistance, per ASTM D2794-93, 120-160 inch-pounds.
      - Salt Spray, per ASTM B117-90, 1000+ hours.
      - Humidity, per ASTM D2247-92, 1000+ hours.
      - Water Soak, per ASTM D2247-92, 1000+ hours.

   c. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall

not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work. Enclosure shall be constructed of minimum 12- gauge steel for framework and 14-gauge steel for panels. All hardware and hinges shall be stainless steel.

d. A factory-mounted critical grade exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.

e. The enclosure shall include flexible coolant and lubricating oil drain lines that extend to the exterior of the enclosure, with internal drain valves and external radiator fill provision.

f. Inlet ducts shall include rain hoods.

g. The generator set shall be provided with a sound-attenuated housing, which allows the generator set to operate at full rated load in an ambient temperature of up to 100F. The enclosure shall reduce the sound level of the generator set while operating at full rated load to a maximum of 83 dBA at any location 7 meters from the generator set in a free field environment. The enclosure shall be insulated with non-hydroscopic materials.

h. Provide motorized louvers to minimize air flow through the enclosure when generator set is not operating. Louvers shall include provisions to prevent accumulation of ice or snow that might prevent operation.

i. Inlet ducts shall include rain hoods.

F. Sequence of Operation

1. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set control and a redundant signal over the required network connection.

2. The generator set shall complete a time delay start period as programmed into the control.

3. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:

a. The control system shall verify that the engine is rotating when the starter is signaled

to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set, and indicate “fail to crank” shutdown.

b. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate, “fail to start”.

c. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed, and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.

d. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous state.

e. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.

f. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.

g. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.

G. Generator Factory Tests

1. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.

2. Factory testing may be witnessed by the owner and consulting engineer. Costs for travel expenses will be the responsibility of the owner and consulting engineer. Supplier is responsible to provide two weeks’ notice for testing.

3. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

7. AUTOMATIC TRANSFER SWITCH (ATS):

A. Provide complete factory assembled power transfer equipment with digital electronic controls designed for surge voltage isolation, and including voltage sensors on all phases of both sources, linear operator, permanently attached manual handles, positive mechanical and electrical interlocking, and mechanically held contacts.

B. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for all the products provided. Technicians specifically trained to support the product and employed by the generator set supplier shall service the transfer switches.

C. Power Transfer Switch

1. Ratings ATS: 250 amp, 3-pole, solid neutral, 240/120 volts. Main contacts shall be rated for 600 Volts AC minimum.

2. Transfer switches shall be rated to carry 100 percent of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C, relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000M).

3. Transfer switch equipment shall have minimum withstand and closing rating (WCR) of 35,000 RMS symmetrical amperes. The transfer switch and its upstream protection shall be coordinated. The transfer switch shall be third party listed and labeled for use with the specific protective device(s) installed in the application.

D. Construction

1. Transfer switch shall be double-throw, electrically and mechanically interlocked, and mechanically held in the source 1 and source 2 positions. The transfer switch shall be specifically designed to transfer to the best available source if it inadvertently stops in a neutral position.

2. Transfer switch shall be equipped with permanently attached manual operating handles and quick-break, quick-make over-center contact mechanisms.

3. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.

4. Transfer switch internal wiring shall be composed of pre-manufactured harnesses that

are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism.

5. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with line voltage components.

6. Transfer switches that are designated on the drawings, as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

E. Connections

1. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

2. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the generator set.

F. Transfer Switch Control:

1. Operator Panel: transfer switch shall be provided with a control panel to allow the operator to view the status and control operation of the transfer switch. The operator panel shall be a sealed membrane panel rated NEMA 4/IP53 or better (regardless of enclosure rating) that is permanently labeled for switch and control functions. Operator panel shall be provided with a lockable vandal resistant hinged cover, key to operate cover shall be same key for ATS overall enclosure. The preceding operator panel shall be provided with the following features and capabilities.

   a. High intensity LED lamps to indicate the source that the load is connected to (source 1 or source 2); and which source(s) are available. Source available LED indicators shall operate from the control microprocessor to indicate the true condition of the sources as sensed by the control.

   b. High intensity LED lamps to indicate that the transfer switch is "not in auto" (due to control being disabled or due to bypass switch enabled or in operation) and "Test/Exercise Active" to indicate that the control system is testing or exercising the generator set.

   c. "OVERRIDE" pushbutton to cause the transfer switch to bypass any active time

delays for start, transfer, and retransfer and immediately proceed with its next logical operation.

d. "TEST" pushbutton to initiate a preprogrammed test sequence for the generator set and transfer switch. The transfer switch shall be programmable for test with load or test without load.

e. "RESET/LAMP TEST" pushbutton that will clear any faults present in the control, or simultaneously test all lamps on the panel by lighting them.

f. The control system shall continuously log information on the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. This information shall be available via a PL-based service tool and an operator display panel.

g. Security Key Switch to allow the user to inhibit adjustments, manual operation or testing of the transfer switch unless key is in place and operated.

h. Analog AC meter display panel, to display 3-phase AC Amps, 3-phase AC Volts, KW load level, and load power factor. The display shall be color-coded, with green scale indicating normal or acceptable operating level, yellow indicating conditions nearing a fault, and red indicating operation in excess of rated conditions for the transfer switch.

i. Vacuum fluorescent alphanumeric display panel with push-button navigation switches. The display shall be clearly visible in both bright (sunlight) and no light conditions. It shall be visible over an angle of at least 120 degrees. The Alphanumeric display panel shall be capable of providing the following functions and capabilities:
   i. Display source condition information, including AC voltage for each phase of normal and emergency source, frequency of each source. Voltage for all three phases shall be displayed on a single screen for easy viewing of voltage balance. Line to neutral voltages shall be displaced for 4-wire systems.
   ii. Display source status, to indicate source is connected or not connected.
   iii. Display load data, including 3-phase AC voltage, 3-phase AC current, frequency, KW, KVA, and power factor. Voltage and current data for all phases shall be displayed on a single screen.
   iv. The display panel shall allow the operator to view and make the following adjustments in the control system, after entering an access code:
      - Set nominal voltage and frequency for the transfer switch.
      - Adjust voltageand frequency sensor operation set points.
      - Set up time clock functions.
      - Set up load sequence functions.

- Enable or disable control functions in the transfer switch, including program transition.
- Set up exercise and load test operation conditions, as well as normal system time delays for transfer time, time delay start, stop, transfer, and retransfer.

v. Display Real time Clock data, including date, and time in hours, minutes, and seconds. The real time clock shall incorporate provision for automatic daylight savings time and leap year adjustments. The control shall also log total operating hours for the control system.

vi. Display service history for the transfer switch. Display source connected hours, to indicate the total number of hours connected to each source. Display number of times transferred, and total number of times each source has failed.

vii. Display information for other transfer switches in the system, including transfer switch name, real time load in KW on the transfer switch, current source condition, and current operating mode.

viii. Display fault history on the transfer switch, including condition, and date and time of fault. Faults to include controller checksum error, low controller DC voltage, ATS fail to close on transfer, ATS fail to close on retransfer, battery charger malfunction, network battery voltage low, network communications error.

2. Internal Controls:

a. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600VAC. Provide RMS voltage sensing and metering that is accurate to within plus or minus 1% of nominal voltage level. Frequency sensing shall be accurate to within plus or minus 0.2%. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions are not acceptable.

b. Transfer switch voltage sensors shall be close differential type, providing source availability information to the control system based on the following functions:

i. Monitoring all phases of the normal service (source 1) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of normal voltage level).

ii. Monitoring all phases of the emergency service (source 2) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of pickup voltage level).

iii. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for voltage imbalance.

iv. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for loss of a single phase.

v. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for phase rotation.
vi. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for over voltage conditions (adjustable for dropout over a range of 105 to 135% of normal voltage, and pickup at 95-99% of dropout voltage level).
vii. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for over or under frequency conditions.
viii. Monitoring the neutral current flow in the load side of the transfer switch. The control shall initiate an alarm when the neutral current exceeds a preset adjustable value in the range of 100-150% of rated phase current for more than an adjustable time period of 10 to 60 seconds.

c. All transfer switch sensing shall be configurable from a Windows 95, 98, or NT PC-based service tool, to allow setting of levels, and enabling or disabling of features and functions. Selected functions including voltage sensing levels and time delays shall be configurable using the operator panel. Designs utilizing DIP switches or other electromechanical devices are not acceptable. The transfer control shall incorporate a series of diagnostic LED lamps.

d. The transfer switch shall be configurable to control the operation time from source to source (program transition operation). The control system shall be capable of enabling or disabling this feature, and adjusting the time period to a specific value. A phase band monitor or similar device is not an acceptable alternate for this feature.

e. The transfer switch shall incorporate adjustable time delays for generator set start (adjustable in a range from 0-15 seconds); transfer (adjustable in a range from 0-120 seconds); retransfer (adjustable in a range from 0-30 minutes); and generator stop (cool-down) (adjustable in a range of 0-30 minutes).

f. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.

g. The transfer switch shall provide a relay contact signal prior to transfer or retransfer. The time period before and after transfer shall be adjustable in a range of 0 to 50 seconds.

h. The control system shall be designed and prototype tested for operation in ambient temperatures from -40C to +70C. It shall be designed and tested to comply with the requirements of the following voltage and RFI/EMI standards.

i. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

j. The transfer switch network monitoring equipment, when supplied, shall be provided with a battery based auxiliary power supply to allow monitoring of the transfer switch when both AC power sources are non- operational. The battery power supply shall be monitored for proper condition, and the transfer switch shall include an alarm condition to indicate low battery condition.

3. Control Interface:

a. The transfer switch will provide an isolated relay contact for starting of a generator set. The relay shall be normally held open, and close to start the generator set. Output contacts shall be form C, for compatibility with any generator set.

b. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.

G. Enclosure

1. Enclosures shall be UL listed and be NEMA type 4 rated. The cabinet door shall be key-locking. The cabinet shall provide code-required wire bend space at point of entry. Manual operating handles and all control switches (other than key-operated switches) shall be accessible to authorized personnel only by opening the key-locking cabinet door. Transfer switches with manual operating handles and/or non-key-operated control switches located on outside of cabinet do not meet this specification and are not acceptable.

H. Operation

1. Open Transition Sequence of Operation: Transfer switch normally connects an energized utility power source (source 1) to loads and a generator set (source 2) to the loads when normal source fails. The normal position of the transfer switch is source 1 (connected to the utility), and no start signal is supplied to the generator set.

2. Generator Set Exercise (Test) With Load Mode: The control system shall be configurable to test the generator set under load. In this mode, the transfer switch shall control the generator set in the following sequence:

a. Transfer switch shall initiate the exercise sequence at a time indicated in the

exercise timer program, or when manually initiated by the operator.

b. The transfer switch shall issue a compatible start command to the generator set, and cause the generator set to start and run at idle until it has reached normal operating temperature.

c. When the generator set has reached normal operating temperature or after an adjustable time period (whichever is shorter), the control system shall accelerate the generator set to rated voltage and frequency.

d. When the control systems senses the generator set at rated voltage and frequency, it shall operate to connect the loads to the generator set by opening the normal source contacts, and closing the alternate source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.

e. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period, the transfer switch shall automatically reconnect the generator set to the normal service.

f. On completion of the exercise period, the transfer switch shall operate to connect the loads to the normal source by opening the alternate source contacts, and closing the normal source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.

g. The transfer switch shall operate the generator set unloaded for a cool-down period, and then remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

3. Generator Set Exercise (Test) Without Load Mode. The control system shall be configurable to test the generator set without transfer switch load connected. In this mode, the transfer switch shall control the generator set in the following sequence:

a. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.

b. The transfer switch shall issue a compatible start command to the generator set, and cause the generator set to start and run at idle until it has reached normal operating temperature.

c. When the generator set has reached normal operating temperature or after an

adjustable time period (whichever is shorter), the control system shall accelerate the generator set to rated voltage and frequency.

d. When the control systems senses the generator set at rated voltage and frequency, it shall operate the generator set unloaded for the duration of the exercise period.

e. At the completion of the exercise period, the transfer switch shall remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

I. Factory Testing. The transfer switch manufacturer shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be available on request. Test process shall include calibration of voltage sensors.

J. Service and support

1. The manufacturer of the transfer switch shall maintain service parts inventory at a central location, which is accessible to the service location 24 hours per day, 365 days per year.

2. The transfer switch shall be serviced by a local service organization that is trained and factory certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

3. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

8. INSTALLATION

A. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

B. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections

(when required), under the supervision of the equipment supplier.

C. Equipment shall be installed on concrete housekeeping pad or isolation pad as indicated. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.

D. Equipment shall be initially started and operated by representatives of the manufacturer.

E. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to final testing of the system.

F. The generator's fuel tank shall be full at time of project acceptance.

G. The generator and transfer switch start time delays shall be set to have the generator serving power to the facilities within 10 seconds on loss of utility power. Retransfer to normal on restored utility power shall be delayed for 5 minutes and generator shutdown shall be delayed for 10 minutes cool-down period.

9. FACTORY TESTS

A. Equipment supplied shall be fully tested at the factory for function and performance. Factory testing may be witnessed by the owner and consulting engineer. Costs for travel expenses will be the responsibility of the owner and consulting engineer. Supplier is responsible to provide two weeks' notice for testing.

B. Generator set factory tests on the equipment shall be performed at rated load and rated PF. Generator sets that have not been factory tested at rated PF will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

10. ON-SITE ACCEPTANCE TEST

A. The complete installation shall be tested for compliance with the specification following completion of all site work. Representatives of the manufacturer shall conduct testing. Required fuel for testing shall be supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.

B. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a two-hour full load test, and a one step rated load pickup test in accordance with NFPA

110. Provide a resistive load bank and make temporary connections for full load test, if necessary.

C. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service and observing proper operation of the system for at least 2-hours. Coordinate timing and obtain approval for start of test with site personnel.

11. TRAINING

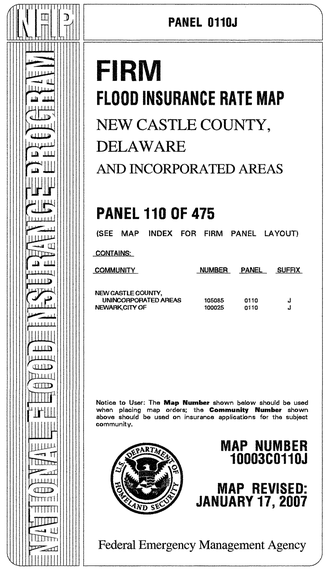
A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.

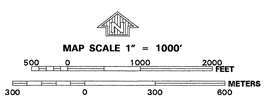
END OF SECTION

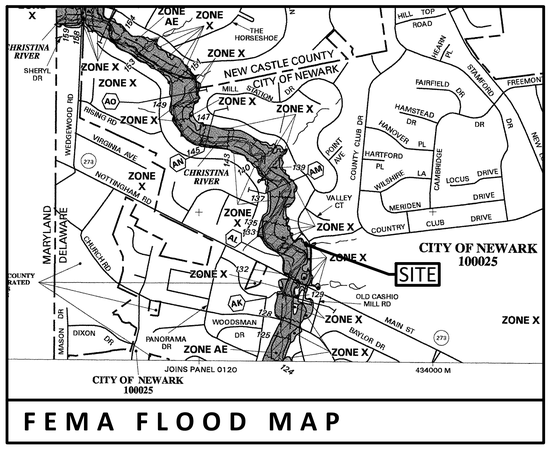
CITY OF NEWARK
PUBLIC WORKS AND WATER RESOURCES DEPARTMENT
NEW CASTLE COUNTY, DELAWARE

NW BOOSTER STATION GENERATOR

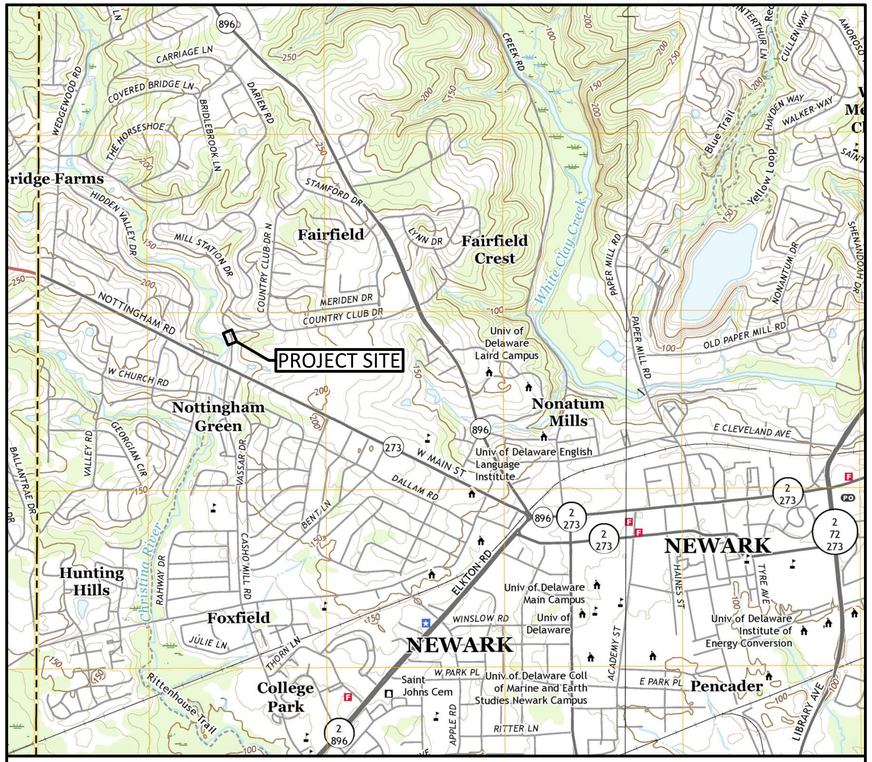
CONTRACT NO. 21-01







FEMA FLOOD MAP



LOCATION MAP 1" = 1/4 MILE

SOURCE: USGS, NEWARK WEST QUADRANGLE, NEWARK EAST QUADRANGLE, 7.5-MINUTE SERIES, 2016

0 1320' 2640'

NORTH

SITE DATA

1. TAX PARCEL NO. 18-006.00-011
2. GRANT NUMBER: PDMC-PJ-03-DE-2010-001
3. SOURCE OF TITLE: DEED RECORD Z 74, PAGE 463 (M.F.# 000706)
4. PROPERTY ADDRESS: 109 DELREM DRIVE NEWARK DE 19713
5. DATUM: DE STATE PLANE (NAD83)
6. FEMA 100 YEAR ELEVATION: 132.7
7. GROSS LOT AREA: 0.433+ ACRES
8. ACCORDING TO FEMA FIRM 10003C0110J, PANEL 110 OF 475, DATED JANUARY 17, 2007 THE WATER BOOSTER STATION SITE IS WITHIN ZONE X OF THE 100 YEAR FLOODPLAIN THE BASE FLOOD ELEVATION (BFE) IS 133.0.
9. THE STANDBY GENERATOR CONSTRUCTION, EQUIPMENT, AND MATERIALS SHALL COMPLY WITH THE CITY OF NEWARK STANDARDS AND SPECIFICATIONS.
10. BUILDING AND MECHANICAL SYSTEM CONSTRUCTION SHALL COMPLY WITH CITY OF NEWARK BUILDING CODE.
11. TRAFFIC CONTROL DURING CONSTRUCTION SHALL COMPLY WITH THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS.
12. CONSTRUCTION WITHIN ROAD RIGHT OF WAY:
    - 12.A. ALL MATERIALS AND WORKMANSHIP SHALL MEET THE STATE OF DELAWARE STANDARDS AND SPECIFICATIONS, DATED AUGUST 2001 AND ANY ADDENDUM THERETO.
    - 12.B. ALL DISTURBED AREAS WITHIN THE RIGHT-OF-WAY, AND SUBJECT SITE SHALL BE TOPSOILED (6" MINIMUM), FERTILIZED AND SEEDED.
    - 12.C. MISS UTILITY SHALL BE NOTIFIED THREE (3) CONSECUTIVE DAYS PRIOR TO EXCAVATION, AT 1-800-282-8555.
    - 12.D. ALL SIGNING FOR MAINTENANCE OF TRAFFIC IS THE CONTRACTORS RESPONSIBILITY AND SHALL FOLLOW THE GUIDELINES IN DE MUTCD (LATEST EDITION).
13. EXISTING UTILITIES ARE SHOWN IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION. COMPLETENESS OR CORRECTNESS THEREOF IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE UTILITY COMPANIES INVOLVED IN ORDER TO SECURE THE MOST ACCURATE INFORMATION AVAILABLE AS TO UTILITY LOCATION AND ELEVATION. NO CONSTRUCTION AROUND OR ADJACENT TO UTILITIES SHALL BEGIN WITHOUT NOTIFYING THEIR OWNERS AT LEAST 48 HOURS IN ADVANCE. THE CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE AND ANY DAMAGE DONE TO THEM DUE TO THE CONTRACTOR'S NEGLIGENCE SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT CONTRACTOR'S EXPENSE. TO LOCATE EXISTING UTILITIES IN THE FIELD PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL CONTACT MISS UTILITY OF DELMARVA (TELEPHONE 800-282-8555).
14. THIS PLAN DOES NOT CONTAIN MEASURES NECESSARY FOR OSHA COMPLIANCE AND REQUIREMENTS. ALL CONSTRUCTION ACTIVITY SHALL MEET OSHA REQUIREMENTS.

SHEET INDEX

MISS UTILITY OF DELMARVA

BEFORE YOU DIG CALL
1-800-282-8555
PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE

CITY OF NEWARK
PUBLIC WORKS AND WATER RESOURCES DEPARTMENT
220 SOUTH MAIN STREET
NEWARK, DELAWARE 19711
(302) 366-7000
www.newarkde.gov
@CityofNewarkDE

NO.	DATE	REVISIONS	BY
1	1/4/2021	FINAL BID SET	MWF

NW BOOSTER STATION GENERATOR
CONTRACT NO. 21-01

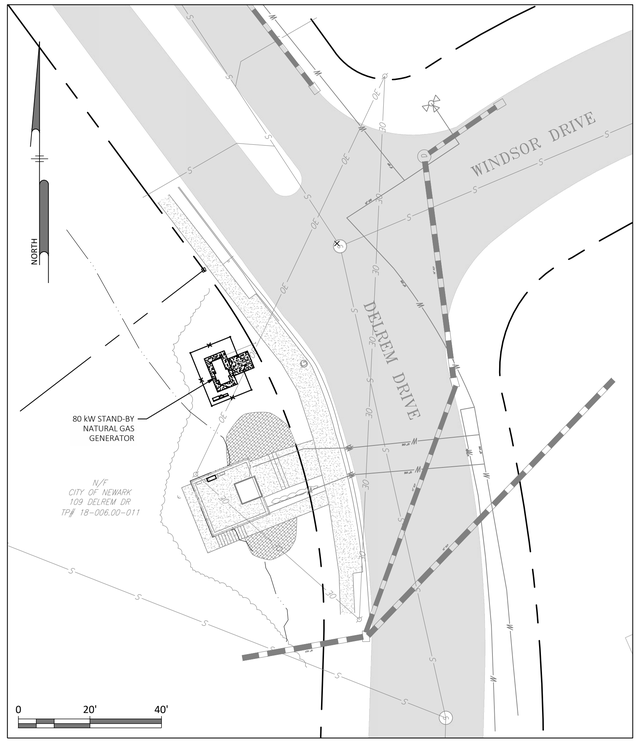
COVER SHEET

109 DELREM DR
NEWARK, DELAWARE 19711

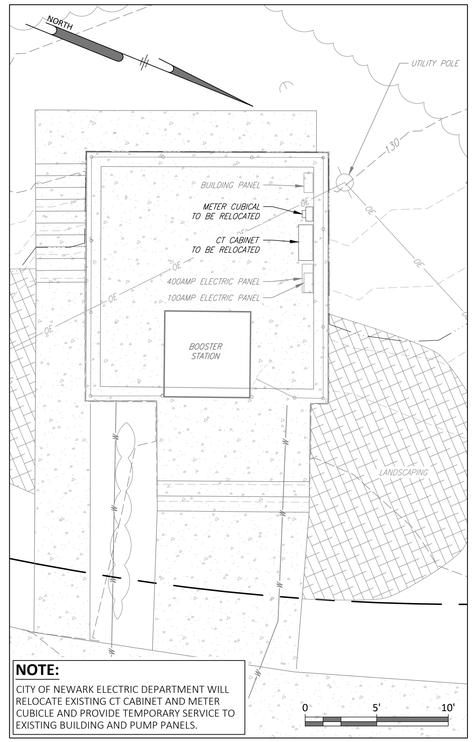
DATE:	2019-07-23
SCALE:	1" = 1/4 MILE
DRAWN BY:	MWF
APPROVED BY:	EJR

DRAWING:
G001

SHEET 1 OF 5

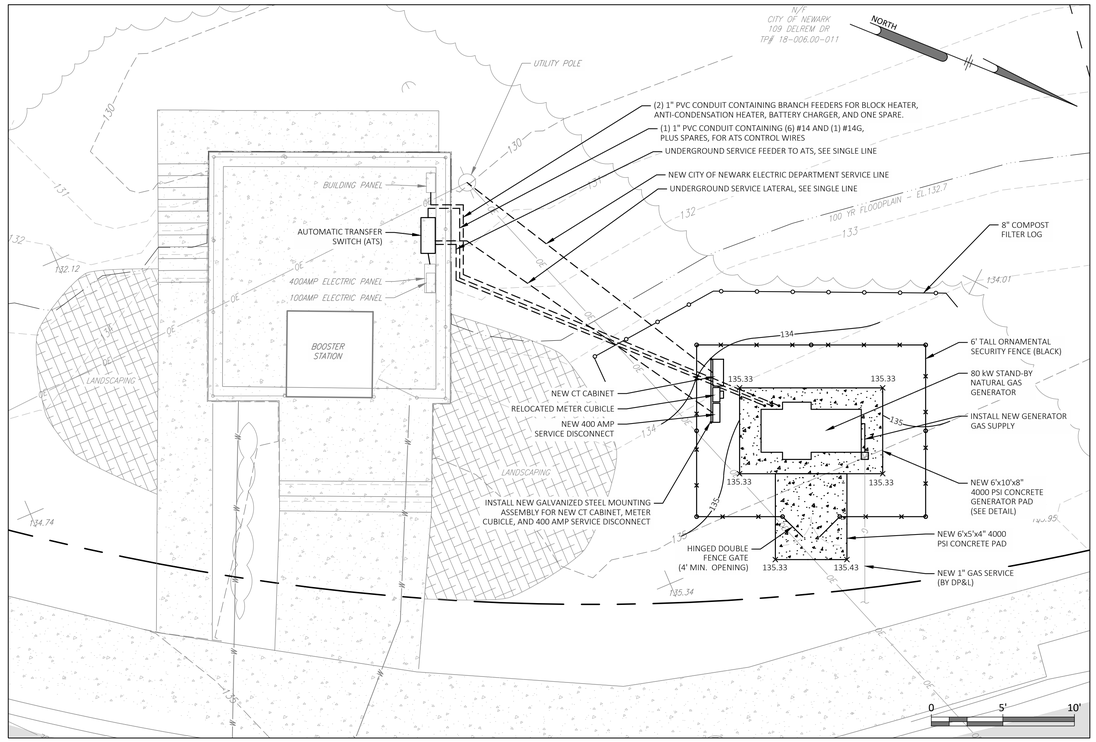


LOCATION PLAN
1" = 20'

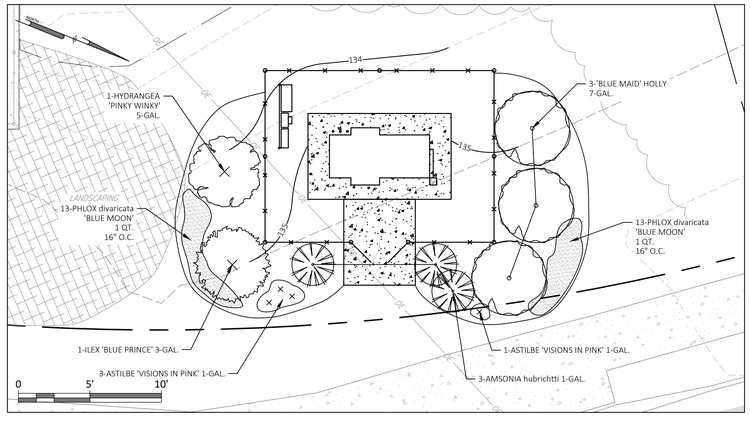


NOTE:
CITY OF NEWARK ELECTRIC DEPARTMENT WILL RELOCATE EXISTING CT CABINET AND METER CUBICLE AND PROVIDE TEMPORARY SERVICE TO EXISTING BUILDING AND PUMP PANELS.

BOOSTER STATION: EXISTING CONDITIONS PLAN
1" = 5'



PROPOSED CONDITIONS SITE PLAN
1" = 5'



LANDSCAPE PLAN
1" = 5'

EROSION & SEDIMENT CONTROL NOTES

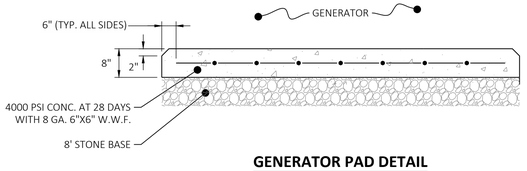
1. LEGAL AUTHORITY: THE CITY OF NEWARK (CITY) IS A DELEGATED AGENCY OF THE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL (DNREC) AS DEFINED IN CHAPTER 40, TITLE 7, OF THE DELAWARE CODE. THE DEPARTMENT MAY ENFORCE COMPLIANCE WITH THE AFOREMENTIONED LAW AND THE DELAWARE EROSION AND SEDIMENT CONTROL THROUGH THE CONTRACT DOCUMENTS OR MAY REFER THE PROJECT TO THE DNREC FOR ENFORCEMENT ACTION.
   THE CONTRACTOR SHALL CONFORM TO THE EROSION CONTROL AND WATER POLLUTION PRACTICES OUTLINED IN SECTION 457 OF THE CITY OF NEWARK STANDARD SPECIFICATIONS FOR ROADS AND UTILITY CONSTRUCTION- JANUARY 2001 AND THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK - APRIL 2016 OR LATEST EDITION.
   IF THE CONTRACT DOCUMENTS SHOULD BE FOUND TO CONFLICT WITH ANY APPLICABLE FEDERAL, STATE, OR MUNICIPAL WATER POLLUTION CONTROL LAW, RULE, OR REGULATION, THE MORE STRINGENT WATER POLLUTION CONTROL REQUIREMENTS SHALL APPLY.
2. DESCRIPTION OF WORK: EROSION AND SEDIMENT CONTROL MEASURES SHAL;L BE APPLIED TO ERODIBLE EARTH MATERIAL EXPOSED BY ANY OF THE CONTRACTOR'S LAND DISTURBING ACTIVITIES ON THE PROJECT. THE WORK SHALL CONSIST OF THE APPLICATION OF TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL ITEMS AS PROVIDED IN THE CONTRACT OR ORDERED BY THE ENGINEER. THE TEMPORARY EROSION CONTROL ITEMS SHALL BE COORDINATED WITH THE PERMANENT EROSION CONTROL ITEMS SPECIFIED. THE ITEMS SHALL INCLUDE, NUT NOT LIMITED TO, THE USE OF BERMS, DIKES, DAMS, SEDIMENT BASINS, TRAPS, GEOTEXTILES, STONE CHECK DAMS, SILT FENCES, PHASED CONSTRUCTION, SPECIAL LAND GRADING METHODS, MATS AND NETS, AGGREGATES, MULCHES, GRASSES, SLOPE DRAINS, CHEMICAL BINDERS, TACKIFIERS, AND OTHER EROSION AND SEDIMENT CONTROL ITEMS OR APPROVED METHODS AS DESIGNATED ON THE CONTRACT DOCUMENTS OR AS DIRECTED BY THE ENGINEER.
3. ALL STORM DRAIN INLETS AND CATCH BASINS, WITHIN AND DOWNSTREAM OF THE WORK AREA, SHALL BE PROVIDED WITH APPROPRIATE INLET PROTECTION PRIOR TO COMMENCEMENT OF ANY EXCAVATION OR SITE DISTURBANCE. THE INLET PROTECTION TYPE AND INSTALLATION SHOULD BE IN ACCORDANCE WITH DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, OR AS APPROVED BY THE CITY.
4. THE CONTRACTOR SHALL INSPECT THE INTEGRITY OF THE PERIMETER CONTROLS PERIODICALLY DURING CONSTRUCTION.
5. THE PERIMETER EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED AFTER THE DISTURBED AREA HAS BEEN APPROPRIATELY STABILIZED AND AUTHORIZED BY THE CITY.
6. EXISTING TREES, BUSHES, AND SHRUBS SHALL BE PROTECTED BY CONTRACTOR FROM ALL DAMAGE UNLESS IN DIRECT CONFLICT WITH THE WORK.

GENERAL NOTES

1. ALL CONSTRUCTION, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH THE CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS AND WATER RESOURCES DETAIL STANDARDS FOR ROAD AND UTILITY CONSTRUCTION, DETAILS AND SUPPLEMENTS.
2. NO EXCAVATIONS WERE CONDUCTED DURING THE PREPARATION OF THESE PLANS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS/HER OWN SATISFACTION. EXACT LOCATION AND COMPLETENESS IS NOT GUARANTEED. CONTRACTOR SHALL BE MADE AWARE THAT VERIZON AND COMCAST COMMUNICATION UTILITIES ARE NOT SHOWN ON THE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL INFORMATION THAT MAY AFFECT WORK.
3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH HAVE OCCURRED BY HIS/HER FAILURE NOT TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES AFFECTING HIS/HER WORK. ITEMS SHALL BE REPLACED WITH THE SAME TYPE OF MATERIAL THAT WAS REMOVED OR DAMAGED DURING CONSTRUCTION OR AS DIRECTED BY THE ENGINEER.
4. CONTRACTOR IS RESPONSIBLE FOR CONTACTING "MISS UTILITY" AT 1-800-282-8555, 48 HOURS PRIOR TO ANY EXCAVATION WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE LOCATION AND ACTIVITIES OF HIS FORCES WITH THE OWNER, AND ABUTTING PROPERTY OWNERS TO MINIMIZE INTERFERENCE WITH EXISTING UTILITIES, PEDESTRIAN TRAFFIC, AND PROPERTY ACCESS. PEDESTRIAN AND VEHICLE ACCESS SHALL BE MAINTAINED AT ALL TIMES. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS AND WATER RESOURCES PROJECT MANAGER AT 302-366-7000, 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
6. THE PLANS AND SPECIFICATIONS DO NOT INCLUDE PROVISIONS FOR CONSTRUCTION SAFETY. A HEALTH AND SAFETY PLAN MUST BE SUBMITTED BY CONTRACTOR PRIOR TO STARTING WORK.
7. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES, CURBS, SIDEWALK, PAVING, SHRUBS, FENCING, ETC. ANY AND ALL DAMAGE DONE TO SAME SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT CONTRACTOR'S EXPENSE.
8. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL SEDIMENT AND EROSION CONTROL MEASURES NECESSARY TO CONSTRUCT THE WORK OUTLINED IN THE PLANS AND SPECIFICATIONS IN ACCORDANCE WITH THE (DNREC) DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, REV. APRIL 2016, INCLUDING ALL REVISIONS FOLLOWING THIS DATE. PAYMENT TO FURNISH, INSTALL, MAINTAIN AND REMOVE ALL NECESSARY EROSION AND SEDIMENT CONTROL DEVICES/MEASURES SHALL BE INCIDENTAL TO THE WORK BEING PERFORMED PER PLANS.
9. METHODS, PROCEDURES AND THE SEQUENCES OFCONSTRUCTION (OTHER THAN THAT NOTED ON THE DRAWINGS) ARE THE RESPONSIBILITY OF THE CONTRACTOR(S).
10. ROADWAYS SHALL BE KEPT CLEAN AT ALL TIMES. ALL SOIL SPILLED, DROPPED, WASHED OR TRACKED ONTO ROADWAYS OR OTHER IMPERVIOUS SURFACES MUST BE REMOVED IMMEDIATELY.
11. ALL DEBRIS SHALL BE REMOVED ON A DAILY BASIS TO MINIMIZE TRAFFIC INTERRUPTIONS. CONTRACTOR IS RESPONSIBLE FOR SECURING STORAGE AND STAGING AREAS AT HIS OWN EXPENSE.
12. CONTRACTOR SHALL PROTECT AND MAINTAIN EXISTING STREET LIGHTING AND TRAFFIC SIGNAL FACILITIES. ANY STREET LIGHTING AND TRAFFIC SIGNAL EQUIPMENT, CABLE, AND CONDUIT FACILITIES AFFECTED BY THE WORK SHALL BE REPLACED IN KIND AT THE SOLE EXPENSE OF THE CONTRACTOR.
13. THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN A JOBSITE FREE OF LITTER AND TRASH. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE SITE AT THE END OF THE DAY TO CLEAN UP ANY TRASH OR LITTER GENERATED BY THE PERSONNEL AND SUBCONTRACTORS WORKING FOR THE CONTRACTOR.
14. THE ENDS OF ALL CURBS ON NORTH COLLEGE AVENUE SHALL BE DEPRESSED FLUSH WITH THE PAVEMENT.
15. STAGING AREAS - PROPER EROSION AND SEDIMENT CONTROL MEASURES AS DETERMINED BY THE ENGINEER SHALL BE INSTALLED IN ALL STAGING AREAS. ALL AREAS USED BY THE CONTRACTOR FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE CONTRACT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO IT'S ORIGINAL CONDITION. IF THE AREA IS UNPAVED, IT SHALL BE RE-GRADED, TOPSOILED, SEEDED AND MULCHED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE ENGINEER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, ALL COSTS ASSOCIATED WITH A REESTABLISHING A SATISFACTORY STAND OF GRASS SHALL BE AT THE CONTRACTOR'S EXPENSE.
16. IN AREAS WHERE PROPOSED CURB MEETS EXISTING CURB AND TWO CURB TYPES ARE NOT SIMILAR, THE PROPOSED CURB SHALL BE TRANSITIONED IN 10 LINEAR FEET, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. PAYMENT FOR THIS WORK, INCLUDING SAW CUTTING EXISTING CURB SHALL BE INCIDENTAL TO THE PROPOSED CURB ITEM.
17. ALL HOT-MIX AND CONCRETE SAW CUTTING SHALL BE FULL DEPTH, UNLESS OTHERWISE NOTED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

MISS UTILITY
OF
DELMARVA

BEFORE YOU DIG CALL
1-800-282-8555
PROTECT YOURSELF, GIVE TWO WORKING DAYS NOTICE



GENERATOR PAD DETAIL
NOT TO SCALE

CITY OF NEWARK
PUBLIC WORKS AND WATER
RESOURCES DEPARTMENT
220 SOUTH MAIN STREET
NEWARK, DELAWARE 19711
(302) 366-7000
www.newarkde.gov
@CityofNewarkDE

NO.	DATE	BY
1	1/4/2021	MWF

FINAL BID SET
REVISIONS

NW BOOSTER STATION GENERATOR
CONTRACT NO. 21-01

SITE PLAN

109 DELREM DR
NEWARK, DELAWARE 19711

DATE:	2019-07-23
SCALE:	1" = 5'
DRAWN BY:	MWF
APPROVED BY:	EJR

DRAWING:
C101

SHEET 2 OF 5

PLOTTED: January 4, 2021

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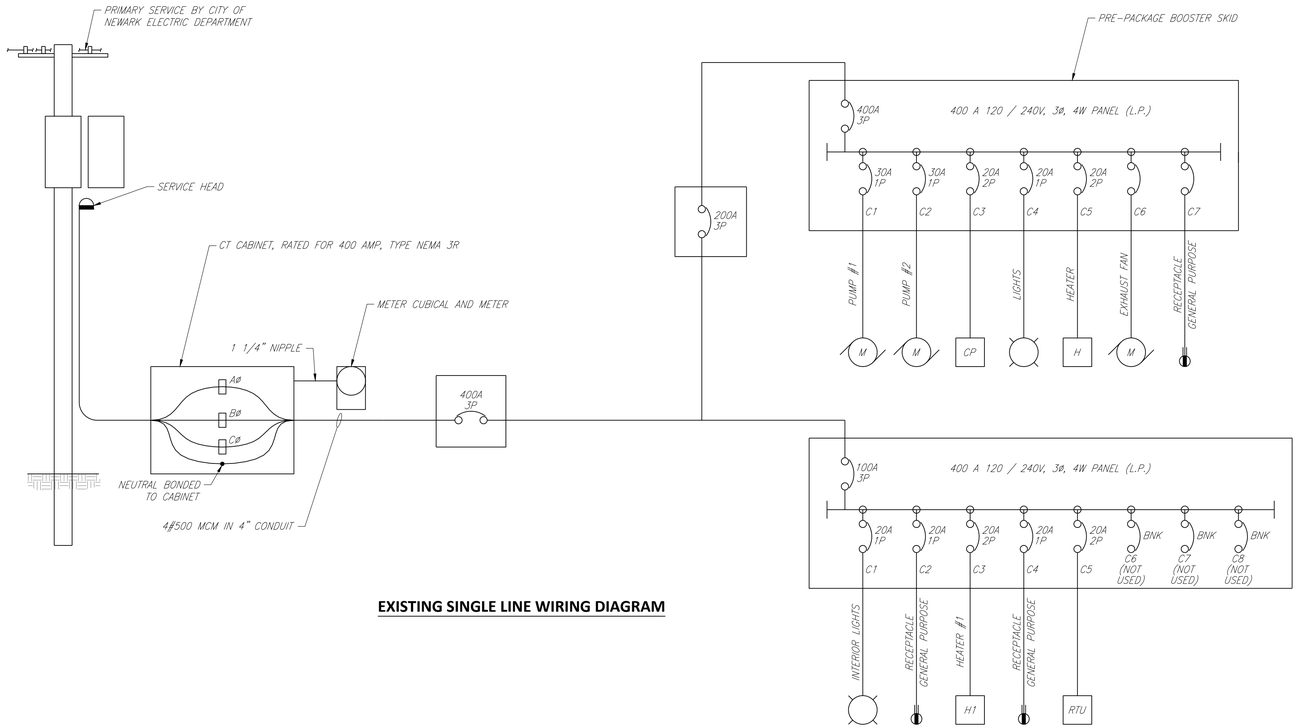
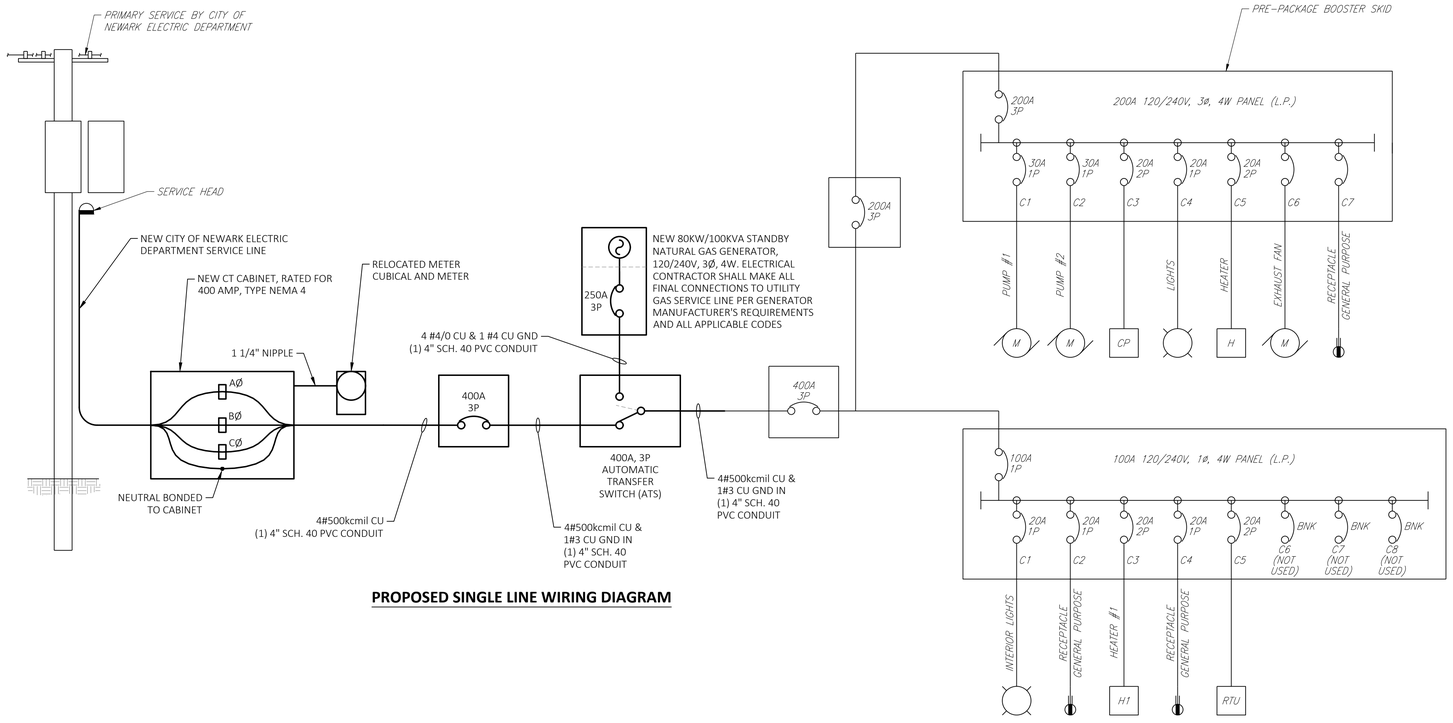
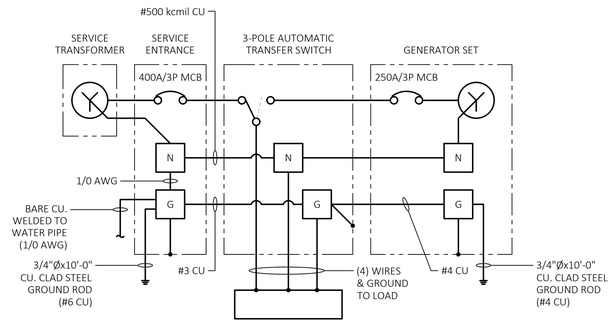


EXISTING SINGLE LINE WIRING DIAGRAM



PROPOSED SINGLE LINE WIRING DIAGRAM



ELECTRIC SERVICE/GENERATOR NEUTRAL/GROUND DIAGRAM

ELECTRICAL NOTES

1. CONTRACTOR SHALL INSTALL ALL EQUIPMENT, RACEWAYS, WIRING, GROUNDING AND BONDING AND PERFORM ALL WORK TO CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE, NFPA 70.
2. CONTRACTOR IS RESPONSIBLE FOR VISITING THE JOB SITE PRIOR TO STARTING WORK TO EXAMINE EXISTING CONDITIONS THAT MAY AFFECT HIS WORK.
3. CONTRACTOR TO VERIFY ALL CONDITIONS AT SITE PRIOR TO BIDDING AND BEGINNING OF WORK. ALL WORK SHALL BE SCHEDULED AND COORDINATED WITH OTHER CONTRACTORS. CONTRACTOR SHALL FURNISH ALL INFORMATION NEEDED BY OTHER CONTRACTORS THAT ARE NECESSARY TO COMPLETE THEIR WORK.
4. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH THE OWNER. WORK SHALL ALLOW FOR DAILY OPERATION OF THE PROJECT SITE WITHOUT INTERRUPTION. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM THE OWNER TO DE-ENERGIZE ANY OPERATING EQUIPMENT OR DISRUPT ANY COMMUNICATION LINE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING & OBTAINING APPROVAL FOR ALL WORK INVOLVING UTILITIES. CONTRACTOR SHALL PROVIDE ALL CUSTOMER WORK AS REQUIRED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR DISCOVERY AND MARKING OF ALL UNDERGROUND UTILITIES IN PROJECT AREA. ANY DAMAGE CAUSED BY THIS CONTRACTOR TO EXISTING UNDERGROUND UTILITIES, DEEMED BY THE OWNER TO REMAIN INTACT, SHALL BE RESTORED TO ORIGINAL CONDITION. ALL REPAIRS SHALL BE INCURRED AT THE EXPENSE OF THE CONTRACTOR ALONE. REPAIRS SHALL BE IN ACCORDANCE WITH ALL CURRENT APPLICABLE LOCAL, STATE AND FEDERAL CODES.
7. ALL MATERIAL SHALL BE NEW AND WHERE APPLICABLE SHALL BE UL LABELED OR APPROVED. ALL REQUIRED WIRING FOR POWER AND CONTROL SHALL BE PROVIDED BY THE CONTRACTOR. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.
8. CONTRACTOR SHALL PERFORM ALL CUTTING AND CORING FOR THE PASSAGE OF CONDUIT THROUGH WALLS, PADS, FLOORS, FOUNDATIONS, ROADWAYS & OTHER SURFACES WHERE NECESSARY TO INSTALL HIS WORK. CONTRACTOR SHALL CLOSE ALL SUCH OPENINGS AROUND CONDUIT WITH MATERIAL EQUIVALENT TO THAT REMOVED AND RESTORE TO EXISTING FIRE RATING. ALL EXPOSED SURFACES SHALL BE PATCHED TO MATCH EXISTING CONDITIONS.
9. CONTRACTOR SHALL PROVIDE ALL NECESSARY COMPONENTS REQUIRED FOR MAKING FINAL CONNECTIONS OF ALL EQUIPMENT INSTALLED OR MODIFIED AS PART OF THIS CONTRACT.
10. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL DEMONSTRATE THAT THE INSTALLATIONS ARE COMPLETE AND IN PROPER OPERATING ORDER WITH WIRING FREE FROM GROUNDS OR SHORTS AND WITH EQUIPMENT PROPERLY GROUNDED AND BONDED PER THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA-70). THE CONTRACTOR SHALL TEST ALL EQUIPMENT AND DEVICES INSTALLED TO THE SATISFACTION OF THE OWNER.
11. CONTRACTOR SHALL PROVIDE AND PAY FOR A CERTIFICATE OF FINAL INSPECTION AND APPROVAL BY A STATE APPROVED LICENSED ELECTRICAL INSPECTION AGENCY.
12. ELECTRICAL EQUIPMENT MOUNTED TO CONCRETE OR MASONRY WALLS SHALL BE INSTALLED WITH A 1/4" SPACER BETWEEN THE EQUIPMENT AND THE WALL. SPACER SHALL BE STAINLESS STEEL, PVC, OR NYLON.
13. ALL RACEWAYS SHALL BE ROUTED PARALLEL OR PERPENDICULAR TO BUILDING LINES.
14. ELECTRICAL SYSTEM LAYOUTS ARE GENERALLY DIAGRAMMATIC AND LOCATION OF CONDUITS, OUTLETS AND EQUIPMENT IS APPROXIMATE; EXACT ROUTING OF RACEWAYS AND LOCATIONS OF EQUIPMENT SHALL BE GOVERNED BY STRUCTURAL CONDITIONS AND OBSTRUCTIONS. THIS IS NOT TO BE CONSTRUED TO PERMIT REDESIGNING OF SYSTEMS; ALL OUTLETS AND EQUIPMENT SHALL BE INTERCONNECTED AS INDICATED. LOCATE AND INSTALL EQUIPMENT REQUIRING MAINTENANCE AND OPERATION SO THAT EQUIPMENT IS READILY ACCESSIBLE. ANY RELOCATION OF EQUIPMENT MUST BE APPROVED BY THE ENGINEER OR AUTHORIZED REPRESENTATIVE BEFORE INSTALLATION. COORDINATE THE INSTALLATION OF WIRING, RACEWAYS, OUTLET BOXES, SLEEVES, SWITCHES, ETC. WITH OTHER TRADES TO ELIMINATE CONFLICTS WITH PROPER CLEARANCES AND ACCESS.
15. ALL GROUNDING AND BONDING CONDUCTORS SHALL BE COPPER, SIZED PER THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NEPA-70), AND AS INDICATED ON PROJECT DRAWINGS. REFER TO SPECIFICATION DOCUMENTATION FOR EXACT REQUIREMENTS.
16. ALL CONDUIT ENTRY POINTS SHALL BE COORDINATED WITH OWNER. PROVIDE PULL-BOX AT ENTRY POINTS UNLESS OTHERWISE NOTED.
17. GAS SERVICE CONTRACTOR TO COORDINATE WITH DELMARVA POWER AND THE CITY OF NEWARK FOR CONNECTION TO MAIN GAS LINE LOCATED AT DOVE DRIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED CONNECTIONS AND APPURTENANCES TO MAKE THE FUELING SYSTEM TO THE GENERATOR COMPLETE AND OPERATIONAL PER THE CITY OF NEWARK'S SATISFACTION.
18. CONDUITS SHALL REMAIN PVC BELOW GRADE.

NEWARK DELAWARE
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220 SOUTH MAIN STREET
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NO.	DATE	BY
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	REVISIONS	

NW BOOSTER STATION GENERATOR
CONTRACT NO. 21-01

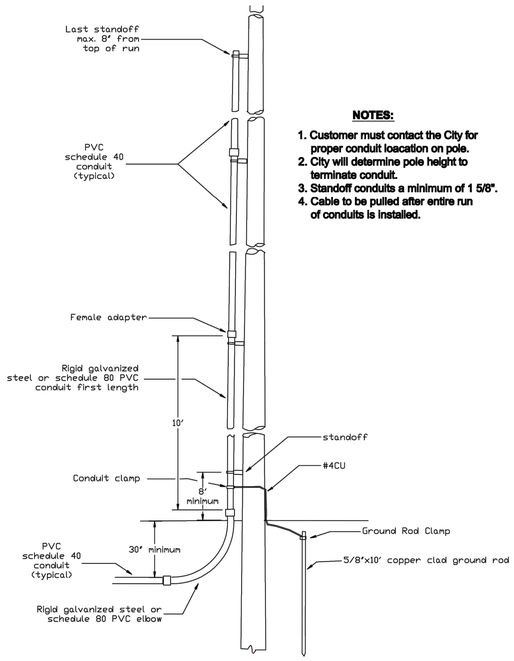
ELECTRICAL PLAN

109 DELREM DR
NEWARK, DELAWARE 19711

DATE:	2019-07-23
SCALE:	1" = 5'
DRAWN BY:	MWF
APPROVED BY:	EJR

DRAWING:
E101

SHEET 3 OF 5

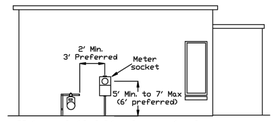


NOTES:

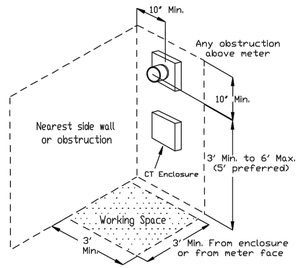
1. **Customer must contact the City for proper conduit loacation on pole.**
2. **City will determine pole height to terminate conduit.**
3. **Standoff conduits a minimum of 1 5/8".**
4. **Cable to be pulled after entire run of conduits is installed.**

Fig. 8

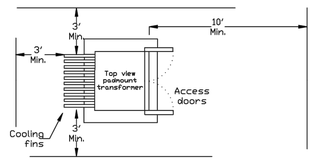
Fig. 9



Meter socket height and gas meter clearance.



Meter socket minimum clearances.



Clear working space for padmount equipment.

Fig. 13

Approved Padmount Transformer Secondary Lugs for 3 phase transformers

NO EXCEPTIONS

Six conductors per phase maximum

Conductor AL/CU	Burndy Part #
1/0 Stranded	YA25A7
2/0 Stranded	YA26A3
4/0 Stranded	YA28A5
250 kcmil	YA29A3
350 kcmil	YA31A3
500 kcmil	YA34A3
600 kcmil	YA36A3
750 kcmil	YA39A5
1000 kcmil	YA44A3

Single Phase Padmounts up to 75kVA – six 350 kcmil conductors maximum per spade
100kVA – six 500 kcmil conductors max, contingent on space for conduits – contact Electric Department for prior approval – connectors supplied by the City of Newark

Standard Primary Pull Box

36"X48"X36" Deep High Density Polyethylene
Pencell PEM3648X with 2 PEM3648-6 Spacers
Identification- ELECTRIC
Note: Contact City of Newark Electric Department if pullbox will be subject to vehicular traffic

Approved Aerial Commercial Service Entrance Connector

(For use on customer owned service conductors connected to aerial City owned conductors – usually triplex or quadriplex)

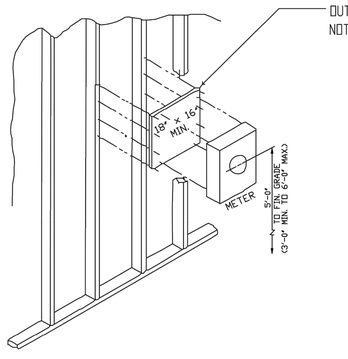
Burndy (FCI) - Unitap or NSI Industries – Polaris System

Note: Contact City of Newark Electric Department to review number of conductors City will supply.

Approved Secondary Lugs for conductors directly connected to Aerial Transformer Bushings

Up to	500 kcmils	City supplies 6 position eyebolt connectors
	600 kcmil	YA36A3
	750 kcmil	YA39A5
	1000 kcmil	YA44A3

Fig. 14

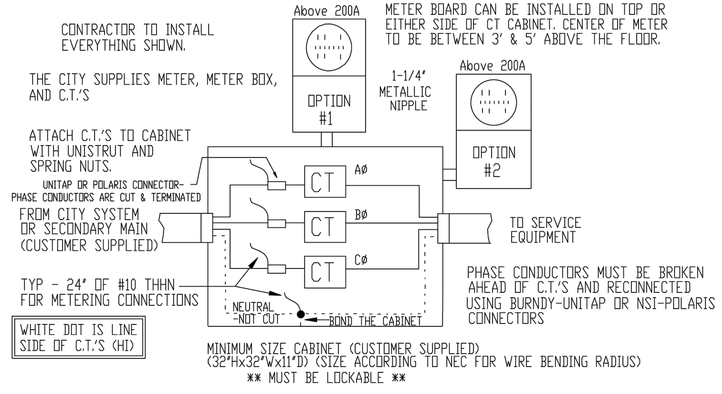


NOTES:

1. METER BOX SUPPLIED AND INSTALLED BY CONTRACTOR.
2. IN ALL CASES APPROVAL FOR METER LOCATION MUST BE OBTAINED FROM THE CITY BEFORE INSTALLATION.
3. SEE FIGURE 5 FOR STANDARD UNDERGROUND INSTALLATION.

Fig. 16

TYPICAL C.T. CABINET INSTALLATION



CITY OF NEWARK
JOINT TRENCHING WITH COMCAST
CABLE & VERIZON TELEPHONE

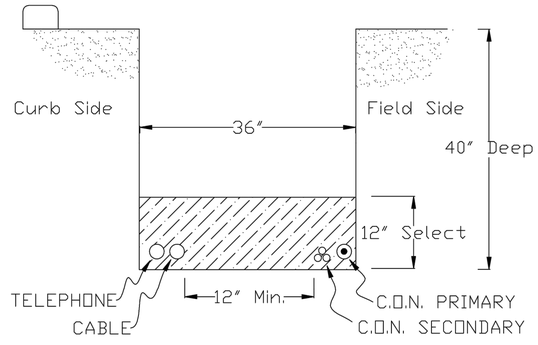


Fig. 17

CITY OF NEWARK
PUBLIC WORKS AND WATER
RESOURCES DEPARTMENT
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NO.	DATE	REVISIONS	BY
1	1/4/2021	FINAL BID SET	MWF

NW BOOSTER STATION GENERATOR
CONTRACT NO. 21-01

ELECTRICAL DETAILS

109 DELREM DR
NEWARK, DELAWARE 19711

DATE:	2019-07-23
SCALE:	1" = 5'
DRAWN BY:	MWF
APPROVED BY:	EJR

DRAWING:

E201

SHEET 4 OF 5

PLOTTED: January 4, 2021
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PLOTTED: January 4, 2021

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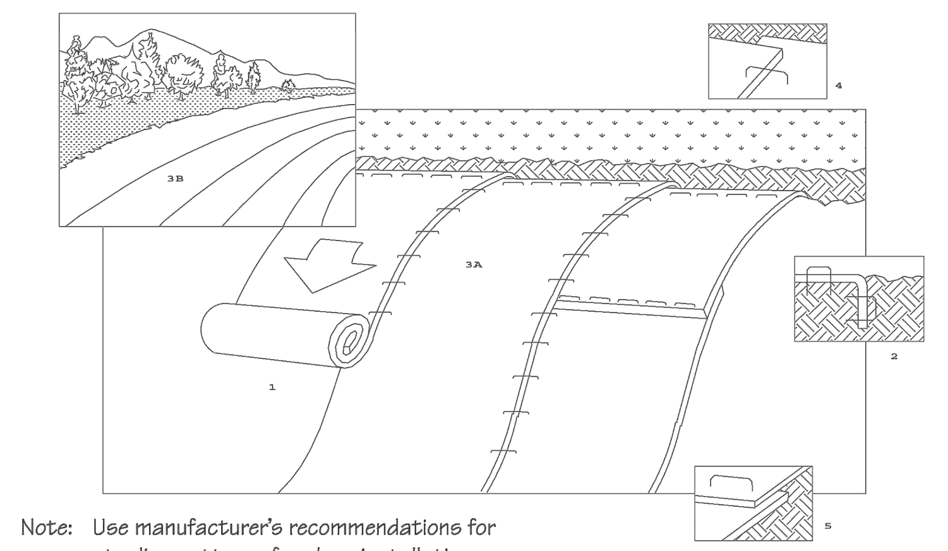
Standard Detail & Specifications
Stabilization Matting - Slope

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK



Note: Use manufacturer's recommendations for stapling patterns for slope installations.

Perspective

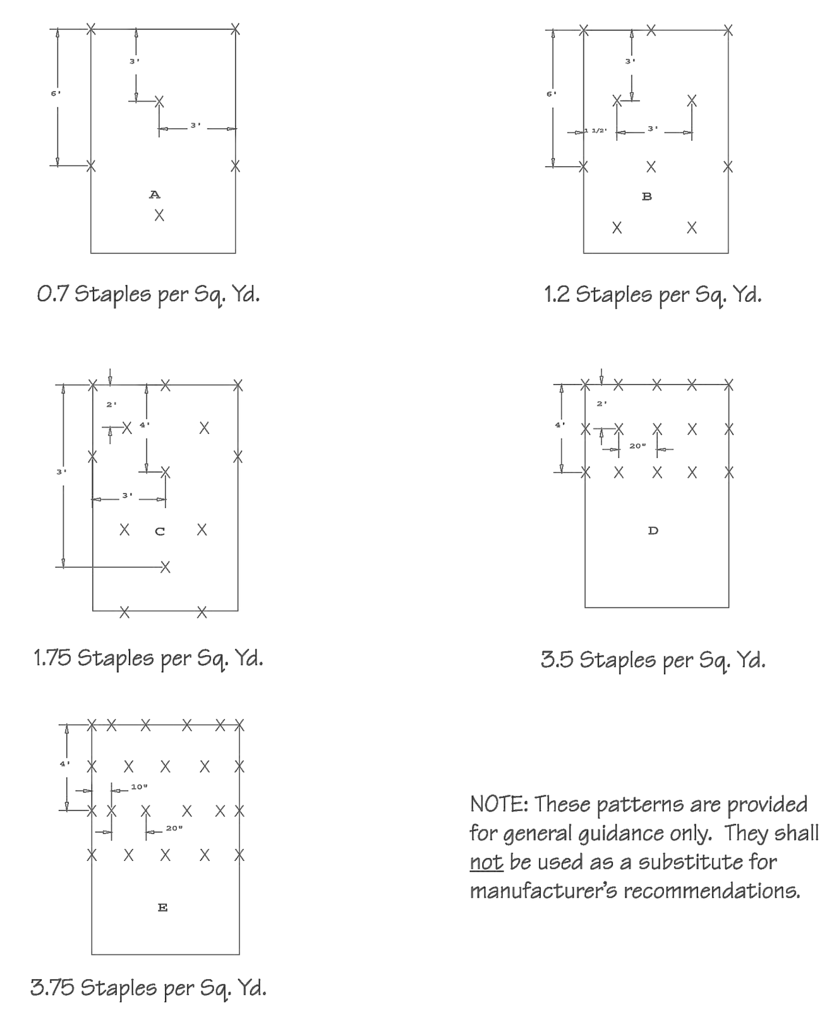
Construction Notes:

1. Prepare soil before installing matting, including application of lime, fertilizer, and seed.
2. Begin at the top of the slope by anchoring the mat in a 6" deep X 6" wide trench. Backfill and compact trench after stapling.
3. Roll the mats (A) down or (B) horizontally across the slope.
4. The edges of parrallel mats must be stapled with approx. 2" overlap.
5. When mats must be spliced down the slope, place mats end over end (shingle style) with approx. 4" overlap. Staple through overlapped area, approx. 12" apart.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	**DE-ESC-3.4.6.1** Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications
Stabilization Matting - Slope

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK



NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

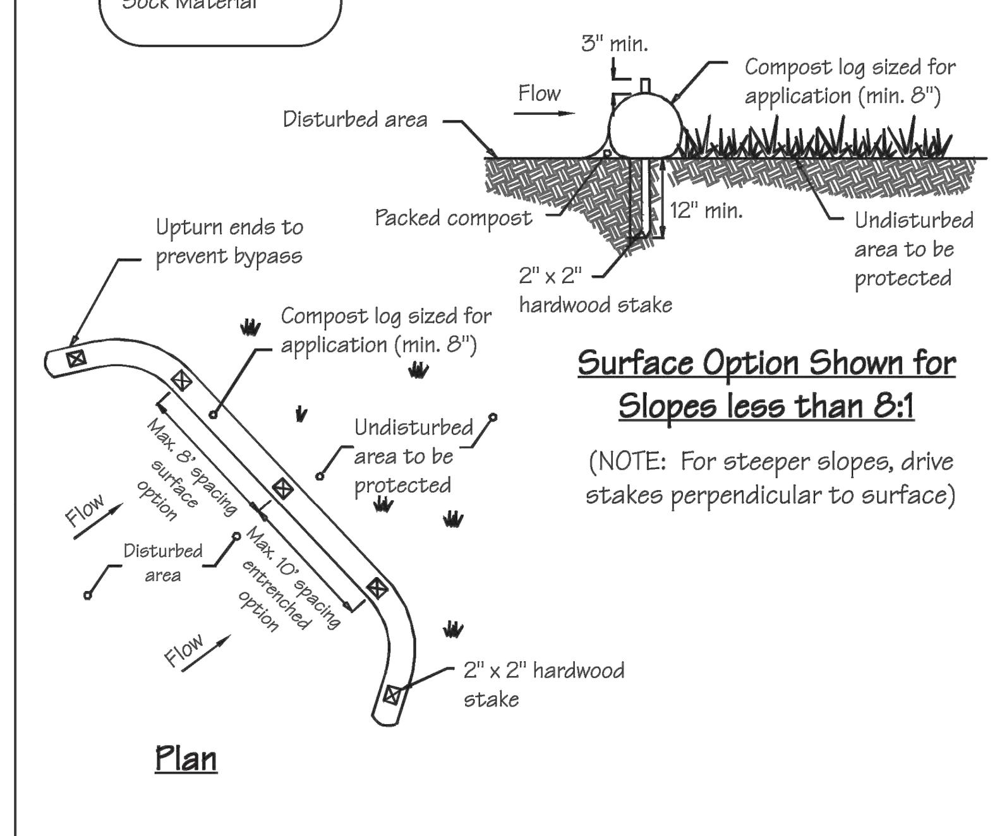
Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	**DE-ESC-3.4.6.1** Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications
Compost Filter Log

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

DATA
Log diameter (D)
Sock Material



NOTE: Manufacturer's recommendations supersede any installation details shown for this practice

Source:	Symbol:	Detail No.
Adapted from MD Stds & Specs for ESC & Filtrexx™ International	CFL	**DE-ESC-3.1.7** Sheet 1 of 2 Effective FEB 2019

Standard Detail & Specifications
Compost Filter Log

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

Construction Notes:

1. Prior to installation, clear bedding area of obstructions including rocks or debris larger than 1 inch and fill in any sharp depression areas.
2. If socks are prepared on-site, fill the sock fabric using a pneumatic blower so that the logs are rigid and do not deform. Terminate at the desired length.
3. For trenched applications, excavate 2 to 4 inches below grade along the width and length of the compost filter log.
4. Install the compost filter logs perpendicular to the flow direction and parallel to the slope with the beginning and end of the installation pointing up the slope a minimum of 1 foot elevation difference. On sites where this is not possible, upturn at a minimum length of 10' at a 30 degree angle to prevent runoff bypass.
5. For untrenched applications, blow or hand pack soil, mulch, or compost on the upslope side of the log, filling the bottom void area.
6. Stake the filled log every 10 feet maximum through the center of the sock for trenched applications, or every 8 feet for untrenched. The stake shall be a 2" by 2" hardwood. It should extend 12" below grade and protrude at least 3" above the top of the sock. If located on a slope greater than 8:1, the stake shall be angled downslope at a 45 degree angle to prevent the force of the water from dislodging to log.
7. When the length of the compost filter log needed exceeds the available compost filter sock length, the next sock shall be overlapped a minimum of 12" before being filled, and a stake placed through both socks at the overlap.
8. Remove accumulated sediment when it has reached half of the effective height of the log.
9. Inspect weekly and after rain event. If sock is degrading or the sock is failing, vegetate to secure the compost, replace the log, or reinforce with an additional log. If the log has been crushed due to construction equipment, it can be "fluffed" back to its effective height. If the effective height can no longer be restored, the log shall be replaced or reinforced with an additional compost filter log.

Source:	Symbol:	Detail No.
Adapted from MD Stds & Specs for ESC & Filtrexx™ International	CFL	**DE-ESC-3.1.7** Sheet 2 of 2 Effective FEB 2019

Standard Detail & Specifications
Vegetative Stabilization

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES

Mix #	Species[6]	Seeding Rate		Optimum Seeding Dates[1] O = Optimum Planting Period; A = Acceptable Planting Period							Planting Depth[3]
				Coastal Plain			Piedmont			All	
	Certified Seed	lb/Ac[5]	lb/1000 sq.ft.	2/1-4/30	[2] 5/1-8/14	8/15-10/31	3/1-4/30	[2] 5/1-7/31	8/1-10/31	10/31-2/1	
1	Barley	125	4	O	A	O	O	A	O		1-2 inches 2-3" sandy soils
2	Oats	125	4	O	A	A	O	A	A		1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	O		0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	O	A	O	O	A	O	A	0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7		O			O			0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5		O			O			0.5 inches 1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Applicable on slopes 3:1 or less.
4. Fifty pounds per acre of Annual Lespedeza may be added to 1/2 the seeding rate of any of the above species.
5. Use varieties currently recommended for Delaware. Contact a County Extension Office for information.
6. Warm season grasses such as Millet or Weeping Lovegrass may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 1 of 4 Effective FEB 2019

Standard Detail & Specifications
Vegetative Stabilization

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

PERMANENT SEEDING AND SEEDING DATES

Mix No.	Seeding Mixtures	Seeding Rate[1]		Optimum Seeding Dates[2] O = Optimum Planting Period A = Acceptable Planting Period							Remarks
	Certified Seed[3]			Coastal Plain			Piedmont			All[4]	
	Well Drained Soils	lb/Ac	lb/1000 sq.ft.	2/1-4/30	5/1-8/14	8/15-10/31	3/1-4/30	5/1-7/31	8/1-10/31	10/31-2/1	
1	Tall Fescue Weeping Lovegrass	140 10	3.2 0.23	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Lovegrass very difficult to mow; Germinates only in hot weather
2	Deertongue Sheep Fescue Common Lespedeza[5] Inoculated	30 30 15	0.69 0.69 0.35	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Good wildlife cover and food
3	Tall Fescue (Turf-type) **or** Strong Creeping Red Fescue **or** Perennial Ryegrass **plus** Flatpea[5]	50 50 50 15	1.15 1.15 1.15 0.34	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Good erosion control mix Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatpea to suppress woody vegetation.
4	Strong Creeping Red Fescue Kentucky Bluegrass Perennial Ryegrass **or** Redtop **plus** White Clover[5]	100 70 15 5 3	2.3 1.61 0.35 0.11 0.07	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Suitable waterway mix. Canada Bluegrass more drought tolerant. Use Redtop for increased drought tolerance.
5	Switchgrass[6,7] **or** Coastal Panicgrass Big Bluestem Little Bluestem Indian Grass	10 10 5 5 5	0.23 0.23 0.11 0.11 0.1		O			O			Native warm-season mixture. Tolerant of low fertility soils. Drought tolerant. Poor shade tolerance. N fertilizer discouraged - weeds
6	Tall Fescue (turf-type) (Blend of 3 cultivars)	150	3.5	O	A	O	O	A	O		Managed filter strip for nutrient uptake.
7	Tall Fescue Ky. Bluegrass (Blend) Perennial Ryegrass	150 20 20	3.5 0.46 0.46	O	A	O	O	A	O		Three cultivars of Kentucky Bluegrass. Traffic tolerant.
8	Big Bluestem[7] Indian Grass[7] Little Bluestem[7] Creeping Red Fescue **plus one of:** Partridge Pea Bush Clover Wild Indigo Showy Tick-Trefoil	10 10 8 30 5 3 3 2	0.23 0.23 0.18 0.69 0.11 0.07 0.07 0.05	O	A		O	A			All species are native. Indian Grass and Bluestem have fluffy seeds. Plant with a specialized native seed drill. Creeping Red Fescue will provide erosion protection while the warm season grasses get established.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 2 of 4 Effective FEB 2019

Standard Detail & Specifications
Vegetative Stabilization

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

PERMANENT SEEDING AND SEEDING DATES (cont.)

Mix No.	Seeding Mixtures	Seeding Rate[1]		Optimum Seeding Dates[2] O = Optimum Planting Period A = Acceptable Planting Period							Remarks
	Certified Seed[3]			Coastal Plain			Piedmont			All[4]	
	Poorly Drained Soils	lb/Ac	lb/1000 sq.ft.	2/1-4/30	5/1-8/14	8/15-10/31	3/1-4/30	5/1-7/31	8/1-10/31	10/31-2/1	
9	Redtop Creeping Bentgrass Sheep Fescue Rough Bluegrass	75 35 30 45	1.72 0.8 0.69 1	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Quick stabilization of disturbed sites and waterways
10	Reed Canarygrass[6]	10	0.23	A		O	A		O		Good erosion control, wildlife cover and wetland revegetation.
	Residential Lawns										
11	Tall Fescue Perennial Ryegrass Kentucky Bluegrass Blend	100 25 30	2.3 0.57 0.69	O	A	O	O	A	O		High value, high maintenance, light traffic, irrigation necessary. Well drained soils, full sun.
12	Tall Fescue Perennial Ryegrass Sheep Fescue	100 25 25	2.3 0.57 0.57	O	A	O	O	A	O		Moderate value, low maintenance, traffic tolerant
13	Creeping Red Fescue Chewings Fescue Rough Bluegrass Kentucky Bluegrass	50 50 20 20	1.15 1.15 0.4 0.4	O	A	O	O	A	O		Shade tolerant, moderate traffic tolerance, moderate maintenance.
14	Creeping Red Fescue Rough Bluegrass **or** Chewings Fescue	50 90	1.15 2.1	O	A	O	O	A	O		Shade tolerant, moisture tolerant.
15	K-31 Tall Fescue	150	3.5	O	A	O	O	A	O		Monoculture, but performs well alone in lawns. Discouraged.

1. When hydroseeding is the chosen method of application, the total rate of seed should be increased by 25%.
2. Winter seeding requires 3 tons per acre of straw mulch. Planting dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The maximum % of weed seeds shall be in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code.
4. Cool season species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
5. All leguminous seed must be inoculated.
6. Warm season grass mix and Reed Canary Grass cannot be mowed more than 4 times per year.
7. Warm season grasses require a soil temperature of at least 50 degrees in order to germinate, and will remain dormant until then.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 3 of 4 Effective FEB 2019

Standard Detail & Specifications
Vegetative Stabilization

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

Construction Notes:

1. Site Preparation
   a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.
   b. Final grading and shaping is not necessary for temporary seedings.
2. Seedbed Preparation

   It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.
3. Soil Amendments
   a. Lime - Apply liming materials based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.
   b. Fertilizer - Apply fertilizer based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils.
4. Seeding
   a. For **temporary stabilization**, select a mixture from **Sheet 1 .** For a **permanent stabilization**, select a mixture from **Sheet 2** or **Sheet 3** depending on the conditions. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.
   b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.
   c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.
5. Mulching

   All mulching shall be done in accordance with detail **DE-ESC-3.4.5**.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 4 of 4 Effective FEB 2019

Standard Detail & Specifications
Mulching

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

1. Materials and Amounts

a. *Straw* - Straw shall be unrotted small grain straw applied at the rate of 1-1/2 to 2 tons per acre, or 70 to 90 pounds (two bales) per 1,000 square feet. Mulch materials shall be relatively free of weeds and shall be free of noxious weeds such as; thistles, Johnsongrass, and quackgrass. Spread mulch uniformly by hand or mechanically. For uniform distribution of hand spread mulch, divide area into approximately 1,000 square feet sections and place 70-90 pounds (two bales) of mulch in each section.

b. *Wood chips* - Apply at the rate of approximately 6 tons per acre or 275 pounds per 1,000 square feet when available and when feasible. These are particularly well suited for utility and road rights-of-way. If wood chips are used, increase the application rate of nitrogen fertilizer by 20 pounds of N per acre (200 pounds of 10-10-10 or 66 pounds of 30-0-0 per acre).

c. *Hydraulically applied mulch* -The following conditions apply to hydraulically applied mulch:

i. Definitions:
   a. Wood fiber mulch shall consist of specially prepared wood that has been processed to a uniform state, is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment, and consists of a minimum of 70% virgin or recycled wood fiber combined with 30% paper fiber and additives.
   b. Blended fiber mulch shall consist of any hydraulic mulch that contains greater than 30% paper fiber. The paper component must consist of specially prepared paper that has been processed to a uniform fibrous state and is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment.
   c. A bonded fiber matrix (BFM) consists of long strand, specially prepared wood fibers that have been processed to a uniform state held together by a water resistant bonding agent. BFMs shall contain no paper (cellulose) mulch but may contain small percentages of synthetic fibers to enhance performance.
   d. Refer to **Figure 3.4.5a** for conditions and limitations of use for each of the above categories of hydraulic mulch.

ii. All components of the hydraulically applied mulches shall be pre-packaged by the manufacturer to assure material performance. Field mixing of the mulch components is acceptable, but must be done per manufacturers recommendations to ensure the proper results.

iii. Hydraulic mulches shall be applied with a viable seed and at manufacturer's recommended rates. Increased rates may be necessary based on site conditions.

iv. Hydraulically applied mulches and additives shall be mixed according to manufacturers recommendations.

iv. Materials within this category shall only be used when hydraulically applied mulch has been specified for use on the approved Sediment and Stormwater Plan, or supplemental approval from the plan approval agency has been obtained in writing for a specific area.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 1 of 3 Effective FEB 2019

Standard Detail & Specifications
Mulching

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

v. Application:
   a. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope.
   b. Do not apply to saturated soils, or if precipitation is anticipated within 24-48 hours.
   c. During the spring (March 1 to May 31) and fall (September 1 to November 30) seasons, hydraulic mulches may be applied in a one-step process where all components are mixed together in single-tank loads. It is recommended that the product be applied from opposing directions to achieve optimum soil coverage.
   d. During the summer (June 1 to August 31) and winter (December 1 to February 28) seasons, the following two-step process is required:
      Step One– Mix and apply seed and soil amendments with a small amount of mulch for visual metering.
      Step Two – Mix and apply mulch at manufacturers recommended rates over freshly seeded surfaces. Apply from opposing directions to achieve optimum soil coverage.
   e. Minimum curing temperature is 40° F (4° C). The best results and more rapid curing are achieved at temperatures exceeding 60° F (15° C). Curing times may be accelerated in high temperature, low humidity conditions on dry soils.

vi. Recommended application rates are for informational purposes only. Conformance with this standard and specification shall be performance-based and requires **100% soil coverage**. Any areas with bare soil showing shall be top dressed until full coverage is achieved.

d. *Compost blanket (CB)* - Loosely applied with a pneumatic blower so that a 1" compost blanket uniformly covers the **soil with 100% coverage**. This application can be used with seed to promote germination by applying the approved seed mix directly into the loosely blown compost. The compost blanket performs best on slopes less than 2:1 and requires no mulch anchoring.

2. Anchoring mulch - Mulch must be anchored immediately to minimize loss by wind or water. This may be done by one of the following methods, depending upon size of area, erosion hazard, and cost.

a. *Crimping* - A crimper is a tractor drawn implement designed to punch and anchor mulch into the top two (2) inches of soil. This practice affords maximum erosion control but is limited to flatter slopes where equipment can operate safely. On sloping land, crimping should be done on the contour whenever possible.

b. *Tracking* - Tracking is the process of cutting mulch (usually straw) into the soil using a bulldozer or other equipment that runs on cleated tracks. Tracking is used primarily on slopes 3:1 or steeper and should be done up and down the slope with cleat marks running across the slope.

c. *Liquid mulch binders* - Applications of liquid mulch binders should be heavier at edges, in valleys, and at crests of banks and other areas where the mulch will be moved by wind or water. All other areas should have a uniform application of binder. The use of synthetic binders is the preferred method of mulch binding and should be applied at the rates recommended by the manufacturer.

d. *Paper fiber* - The fiber binder shall be applied at a net dry weight of 750 lbs/ac. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons.

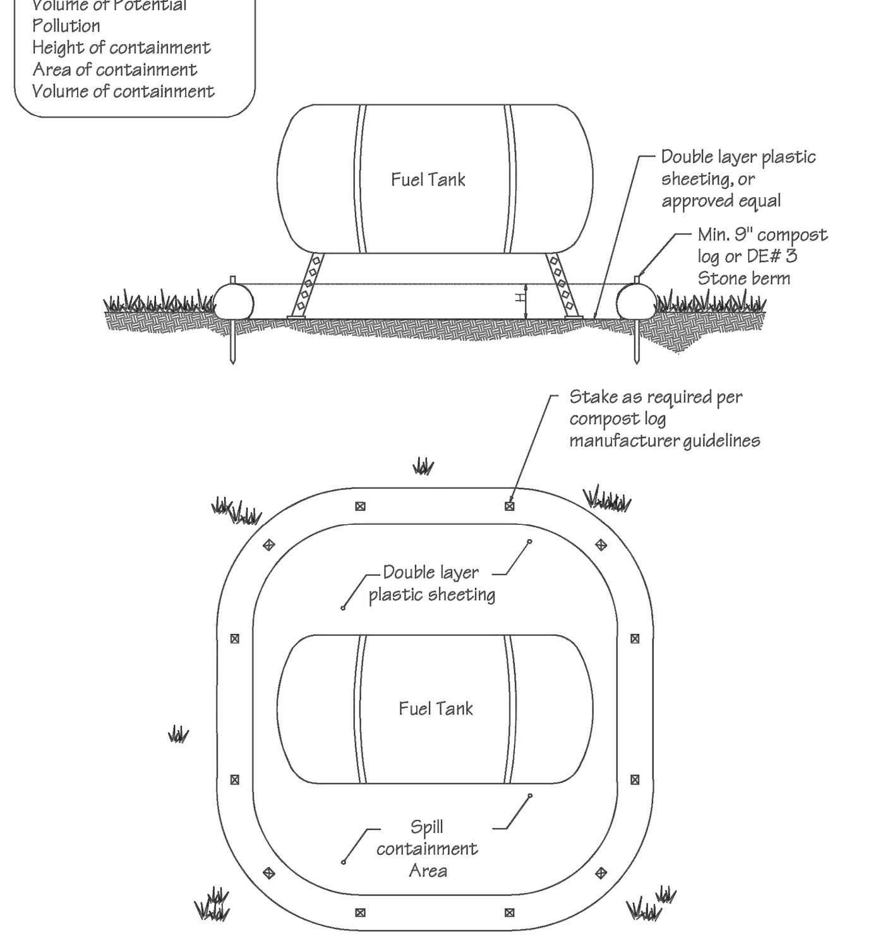
e. *Nettings* - Synthetic or organic nettings may be used to secure straw mulch. Install and secure according to the manufacturers recommendations.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 2 of 3 Effective FEB 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

DATA TO BE PROVIDED
Volume of Potential Pollution
Height of containment
Area of containment
Volume of containment



Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 1 of 5 Effective FEB 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

Pollution Prevention – Spill Prevention

1. Fueling should only take place in signed designated areas, away from downstream drainage facilities and watercourses.
2. Fueling must be with nozzles equipped with automatic shut-off to control drips. Do not top off.
3. Protect the areas where equipment or vehicles are being repaired, maintained, fueled or parked from storm water run-on and runoff.
4. Use barriers such as berms to prevent storm water run-on and runoff, and to contain spills.
5. Place a "Fueling Area" sign next to each fueling area.
6. Store hazardous materials such as fuel, solvents, oil and chemicals in secondary containment.
7. Inspect vehicles and equipment for leaks on each day of use. Repair fluid and oil leaks immediately.
8. Absorbent spill clean-up materials and spill kits must be available in fueling areas and on fuel trucks.
9. If fueling is to take place at night, make sure the fueling area is sufficiently illuminated.
10. Properly dispose of used oil, fluids, lubricants and spill clean-up materials.

CLEAN UP SPILLS

1. If it is safe to do so, immediately contain and clean up any chemical and/or hazardous material spills.
2. Properly dispose of used oil, fluids, lubricants and spill clean-up materials.
3. Do not bury spills or wash them down with water.

LEAKS AND DRIPS

1. Use drip pans or absorbent pads at all times. Place under and around leaky equipment.
2. Do not allow oil, grease, fuel or chemicals to drip onto the ground.
3. Have spill kits and clean up material on-site.
4. Repair leaky equipment promptly or remove problem vehicles and equipment from the site. Clean up contaminated soil immediately.
5. Store contaminated waste in sealed containers constructed of suitable material. Label these containers properly.
6. Clean up all spills and leaks. Promptly dispose of waste and spent clean up materials.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 2 of 5 Effective FEB 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

Notes:

The Construction Site Pollution Prevention Plan should include the following elements:

1. Material Inventory

Document the storage and use of the following materials:

a. Concrete
b. Detergents
c. Paints (enamel and latex)
d. Cleaning solvents
e. Pesticides
f. Wood scraps
g. Fertilizers
h. Petroleum based products

2. Good housekeeping practices

a. Store only enough product required to do the job.
b. All materials shall be stored in a neat, orderly manner in their original labeled containers and covered.
c. Substances shall not be mixed.
d. When possible, all of a product shall be used up prior to disposal of the container.
e. Manufacturers' instructions for disposal shall be strictly adhered to.
f. The site foreman shall designate someone to inspect all BMPs daily.

3. Waste management practices

a. All waste materials shall be collected and stored in securely lidded dumpsters in a location that does not drain to a waterbody.
b. Waste materials shall be salvaged and/or recycled whenever possible.
c. The dumpsters shall be emptied a minimum of twice per week, or more if necessary. The licensed trash hauler is responsible for cleaning out dumpsters.

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 3 of 5 Effective FEB 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

Notes (cont.)

d. Trash shall be disposed of in accordance with all applicable Delaware laws.
e. Trash cans shall be placed at all lunch spots and littering is strictly prohibited. Recycle bins shall be placed near the construction trailer.
f. If fertilizer bags can not be stored in a weather-proof location, they shall be kept on a pallet and covered with plastic sheeting which is overlapped and anchored.

4. Equipment maintenance practices

a. If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
b. If performed on-site, vehicles shall be washed with high-pressure water spray without detergents in an area contained by an impervious berm.
c. Drip pans shall be used for all equipment maintenance.
d. Equipment shall be inspected for leaks on a daily basis.
e. Washout from concrete trucks shall be disposed of in a temporary pit for hardening and proper disposal.
f. Fuel nozzles shall be equipped with automatic shut-off valves.
g. All used products such as oil, antifreeze, solvents and tires shall be disposed of in accordance with manufacturers' recommendations and local, state and federal laws and regulations.

5. Spill prevention practices

a. Potential spill areas shall be identified and contained in covered areas with no connection to the storm drain system.
b. Warning signs shall be posted in hazardous material storage areas.
c. Preventive maintenance shall be performed on all tanks, valves, pumps, pipes and other equipment as necessary.
d. Low or non-toxic substances shall be prioritized for use.

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 4 of 5 Effective FEB 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

Notes (cont.)

e. Contact information for reporting spills through the DNREC 24-Hour Toll Free Number shall be prominently posted.

6. Education

a. Best management practices for construction site pollution control shall be a part of regular progress meetings.
b. Information regarding waste management, equipment maintenance and spill prevention shall be prominently posted in the construction trailer.

CONTACT INFORMATION

DNREC 24-Hour Toll Free Number	**800-662-8802**
DNREC Solid & Hazardous Waste Management Section	**302-739-9403**

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 5 of 5 Effective FEB 2019

Standard Detail & Specifications
Mulching

DELAWARE EROSION & SEDIMENT CONTROL HANDBOOK

MULCHING MATERIAL SELECTION GUIDE

Percent Slope	Type of Mulch / App. Rate*	Dec. 1 to Feb. 28(29)	March 1 to May 31	June 1 to Aug. 31	Sept. 1 to Nov. 30
Less than 2%	Blended Fiber @ 2000 lbs/ac. minimum	xxxxxxxxxxxxxxxx	OK (≤1 ac.)	xxxxxxxxxxxxxxxx	OK (≤1 ac.)
	Wood Fiber @ 2000 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	BFM @ 3000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. Min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
2% to 5.9%	Wood Fiber @ 2000 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	BFM @ 3000-3500 lbs/ac. min	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
6% to 10.9%	Wood Fiber @ 2000-2500 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	BFM @ 3500-4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
11% to 24.9%	Wood Fiber @ 2500-3000 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	BFM @ 3500-4000 lbs/ac. min.	OK	OK	OK	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
25% to 33%	Wood Fiber @ 2500-3000 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	BFM @ 4000 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	Straw @ 2 Tons/ac. min.	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	OK	OK	OK	OK
33% and up	BFM @ 4000-4500 lbs/ac. min.	xxxxxxxxxxxxxxxx	OK	xxxxxxxxxxxxxxxx	OK
	Straw @ 2 Tons/ac. min.***	OK	OK	OK	OK
	Stabilization Matting**	OK	OK	OK	OK
	1" Compost Blanket (CB)	2:1 Max.	2:1 Max.	2:1 Max.	2:1 Max.

* Note: Manufacturers Recommended Rates for informational purposes only. Performance standard requires 100% soil coverage.
** Note: Stabilization Matting must be applied in accordance with Section 3.4.6 of the Delaware ESC Handbook.
***Note: Straw applied on slopes greater than 33% must be netted (this does not apply to topsoil stockpiles).
OK = Acceptable to use during this time period.
xx = Not acceptable to use during this time period.
All application rates are minimums

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx™ International		**DE-ESC-3.4.5** Sheet 3 of 3 Effective FEB 2019

NEWARK DELAWARE Committed to Service Excellence

CITY OF NEWARK
PUBLIC WORKS AND WATER RESOURCES DEPARTMENT
220 SOUTH MAIN STREET
NEWARK, DELAWARE 19711
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@CityofNewarkDE

DATE	NO.	REVISIONS	BY
1/4/2021	1	FINAL BID SET	MWF

NW BOOSTER STATION GENERATOR
CONTRACT NO. 21-01

EROSION & SEDIMENT CONTROL DETAILS

109 DELREM DR
NEWARK, DELAWARE 19711

ALL CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE LATEST CITY OF NEWARK STANDARDS AND SPECIFICATIONS AND IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND THE RULES AND REGULATIONS THERETO.

DATE:	2019-07-23
SCALE:	NONE
DRAWN BY:	MWF
APPROVED BY:	EJR

DRAWING: **C801**

SHEET 5 OF 5